MEASURING THE COMPLEXITY OF MEN'S FERTILITY PREFERENCES

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Abstract

Background: Fertility preferences and intentions as measured constructs have no single definition within the literature; debates around the measurement and merits of preferences, intentions, and desires are prevalent. There is little existing data on the influences of fertility preferences among men.

Data and Methods: Data from the Demographic and Health Surveys in 38 countries and from the Family Health and Wealth Study in Ghana as well as primary qualitative data are used to explore inconsistencies or mismatches in men's responses to questions about their preferences. Meta-analytic techniques are used to describe the prevalence of inconsistent responses and meta-regressions are fit to explore associations with factors at the national level. Thematic qualitative analysis is used to identify influences of fertility preferences among men in Ghana and to inform multivariable quantitative analyses.

Results: The average prevalence of mismatch 1, in which men report not wanting another child even though fertility preferences have not been met is 12.1% while mismatch 2 is less common, with 5.0% of men reporting wanting another child after exceeding their fertility preferences. At the national level, infant mortality rate, HIV prevalence, and labor force participation are associated with mismatch 1 ($\beta = -0.12$, $p<0.001$; $\beta = 0.55$, $p<0.001$; $\beta = -0.14$, $p = 0.07$, respectively). Infant mortality and labor force participation were also associated with mismatch 2 ($\beta = 0.04$, $p = 0.04$ and $\beta = 0.09$, $p = 0.02$, respectively). Men in Ghana identified five important individual influences of fertility preferences: economics, relationship quality, health status, religion, and multiple partners. Quantitatively, expectations of future wealth, dimensions of relationship quality, religion,

and health status were all associated with mismatch 1. Wealth expectations, employment, and religion were associated with mismatch 2.

Conclusions: Inconsistent responses to fertility preferences questions are prevalent among men and these mismatches are related to infant mortality and labor force participation, or unemployment at the macro level. At the individual level, relationship quality and health status are influences not often considered in the fertility preferences literature. Men are also often missing in the literature and further research is needed to explore the prevalence and influences of mismatches among men in other settings.

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CHAPTER 1: INTRODUCTION

Introduction

Since 1960, global total fertility rates (TFR), or the number of children a woman is expected to have during her reproductive lifespan, have been on the decline and the worldwide average is about 2.5 children per woman (Suzuki 2014). Yet, this worldwide average masks huge geographical variations. Notably, fertility rates have been slowest to fall in sub-Saharan Africa and some of the highest TFRs can be found in this region as well. Similarly, over the same number of years, there has been an increase in the percent of women who use modern contraception (the modern contraceptive prevalence rate, or mCPR). Worldwide, 57 percent of married women use a modern method but this average again masks geographical and regional variation, with the lowest mCPR in sub-Saharan Africa at 23 percent (PRB 2014).

While the total fertility rate is an estimate of actual fertility levels, researchers and policy makers have increasingly relied on measurements of fertility preferences, or preferred family size, to plan programs, set targets, and address the need for contraception. Preferences are used, in part, to calculate unmet need or as an indication of inability to constrain fertility through the use of modern contraception, thus serving as an indicator of the potential demand for family planning (DHS Program). Family planning programs have used changes in fertility preferences to assess whether programs had any effect on changing beliefs or attitudes about fertility (Phillips et al 2012).

Yet there are at least two notable gaps in the literature and in research when fertility preferences are used in this manner. First, the exploration of the determinants or factors shaping these fertility preferences, or what underlies preferred family size, has been limited. Second, few studies explore the reasons for differences between fertility preferences and actual fertility, except for those studies that attributes these differences to unmet need for modern contraception (Casterline & Sinding 2000; Casterline et al 1997; Mason & Taj 1987).

Conceptualization and Measurement of Fertility Preferences

Fertility preferences are inconsistently conceptualized throughout the fertility literature and measured in various ways. Often when preferences and intentions are treated as distinct concepts, or at least measured as such, ideal family size and desire for another child are used, respectively. Roy et al (2008) find that while these concepts are related and predictive of future fertility, the two are not identical and might be differentially affected by various factors such as sex ratios, sex composition, economic constraints, and child mortality (Roy et al 2008). Ryder & Westoff (1971) conclude that fertility preferences are the most direct attitudinal measure and thus the most fundamental measure. Yet, they argue, preferences are still subjectively measured and that assessments of constraints to reproduction (biological, social, economic) are often reflected in survey measures, hindering the ability of researchers to capture "true" fertility preferences (Ryder & Westoff 1971). In addition, at the individual level, respondents may provide inconsistent responses to what have become standard survey questions intended to measure fertility preferences.

Understanding Fertility Preferences

Most of the research on fertility has been on women; however there has been an increasing focus on the couple as a childbearing unit. Despite data collection in men in the Demographic and Health Surveys, men have mostly been left out of fertility research. When they are included it is most often as part of a couple, or when men's fertility data is reported it is often a woman's report of her partner. Leaving out men, or considering them only as a part of couple, limits our understanding of motivations that underlie their fertility preferences and decisions. Thus, programmatic interventions that seek to change or understand fertility behavior through women may be missing a vital piece of information and a vital intervention point by not understanding men. In addition to including men, it is essential to understand and measure and explain inconsistent responses among men, particularly in low- and middle-income countries, many of which have seen slow drops in TFR and slow rises in mCPR. Next, it important to considers factors at both the macro (national) and micro (individual) levels that may be associated with these inconsistent responses to better understand underlying drivers of both fertility preferences and the inconsistent responses that may be found. A more complete understanding of fertility preferences among men will help researchers to develop more accurate conceptualizations and measures and will help family planning programs and efforts to address men's needs, both for the improvement of their own reproductive health as well as the reproductive health of their partner.

This thesis aims to contribute to the fertility preferences literature in two ways: first, by identifying factors associated with inconsistent fertility preference responses to better understand motivators of fertility preferences and changes in preferences and

second, through its exclusive focus on men. To do so, three main objectives are identified.

Study Aims

Aim 1: To explore the levels and patterns of inconsistent fertility preferences in men across 38 countries in Demographic and Health Surveys

- This aim is descriptive and so no hypothesis will be tested

Aim 2: To examine national-level factors to determine which help explain the two types of mismatch among men.

(1) HIV prevalence will be positively associated with mismatch 1, in which a man's preferred family size is larger than his current family size but he states the he wants no more children, and negatively associated with mismatch 2, in which a man's preferred family size is smaller than his current family size but he states that he would like to have another child

(2) IMR, labor force participation, and GDP per capita will be negatively associated with mismatch 1 and positively associated with mismatch 2

Aim 3: Using both qualitative and quantitative data sources from Ghana, explore how men think about fertility preferences, whether fertility preferences vary over the life course and the individual-level factors associated with mismatch among men in Ghana.

(1) Wealth, health status, employment, and relationship quality will have a negative relationship with mismatch 1 and a positive relationship with mismatch 2

(2) Education and number of wives will have a positive relationship mismatch 1 and a negative relationship with mismatch 2

To address these aims, this thesis is organized into four additional chapters.

Chapter 2, "Inconsistent Fertility Preferences Among Men: Evidence from DHS Data in 38 Countries", first defines inconsistent responses to quantitative fertility preferences questions used throughout the literature into two types of mismatch, a central tenant of all analyses that follow. Data from the Demographic and Health Survey Data in 38 countries is then used to describe the prevalence of both types of mismatch at the country level using meta-analytic techniques.

Chapter 3, "National Level Factors and Inconsistent Fertility Preferences Among Men in 38 DHS Countries", focuses on the same 38 countries and empirically explores the relationship of both types of mismatch among men and several macro level indicators of socioeconomic development using multivariable regression. These macro level indicators include the national infant mortality rate (IMR), Gross Domestic Product/capita, national HIV prevalence, and labor force participation.

Chapter 4, " 'As long as he is bent on having more children, he will go for another woman': Understanding the Influences of Fertility Preferences Among Men in Ghana", uses primary qualitative data and survey data to explore individual level factors related to both types of mismatch among men in Ghana. The qualitative study explores this through data collection in eight focus group discussions among men in peri-urban communities in Ghana. The themes that emerged from these discussions

were then quantitatively operationalized and empirically tested using Round 1 of the Family Health and Wealth Survey[1] in Ghana.

Chapter 5 concludes with a discussion and synthesis of the findings and discusses the research and policy implications of this work.

[1] See www.gatesinstitute.org for more information regarding the Family Health and Wealth Study in five sites: Ghana, Ethiopia, Malawi, Nigeria, and Uganda.

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CHAPTER 2: INCONSISTENT FERTILITY PREFERENCES AMONG MEN: EVIDENCE FROM DHS DATA IN 38 COUNTRIES

Background

Fertility preferences as a concept and measured construct has no single definition within the literature and debates between the measurement of and the merits between preferences, intentions, and desires are prevalent (Casterline & El-Zeini 2007; Yeatman et al 2013; Bankole & Westoff 1998). Often when preferences and intentions are treated as distinct concepts, or at least measured as such, ideal family size and desire for another child are used, respectively. Roy et al (2008) find that while these concepts are related and predictive of future fertility, the two are not identical and might be differentially affected by various factors such as sex ratios, sex composition, economic constraints, and child mortality (Roy et al 2008). Ryder & Westoff (1971) conclude that fertility preferences are the most direct attitudinal measure and thus the most fundamental measure. Yet, they argue, preferences are still subjectively measured and that assessments of constraints to reproduction (biological, social, economic) are often reflected in survey measures, hindering the ability of researchers to capture "true" fertility preferences (Ryder & Westoff 1971).

Since each of these concepts can be conceptualized and measured with reference to number of lifetime children or to more immediate births (e.g. having another child) (Casterline & El-Zeini 2007), it becomes difficult to obtain comparable estimates across time. Much of the existing literature assumes that and treats fertility preferences as constant. Sennott & Yeatman (2012) use longitudinal data from young

women in Malawi and find that preferences are not uniformly stable over time but that 75% of the women in the study did have stability in their stated preferences. Moreover, the study finds that preferences are more stable at older ages - older ages in this particular study are women in their mid to late 20s - and the changes in older ages that do occur are more predictable, since a woman's reproductive future is less uncertain as she ages. Importantly, though, the authors find that fertility preferences start to stabilize, or fluctuate in predictable ways, rather early on in the reproductive lifespan of these women. Thus, fertility preferences remain an important concept to measure and that, because preferences may be somewhat fluid, mismatches between preferences and completed fertility are to be expected (Sennott & Yeatman 2012; Yeatman et al 2013). Roy et al (2008) undertake a similar study using longitudinal data from India and find that responses to fertility preferences questions were largely consistent over time and that sex preference in this context was the biggest influence in changes over time (Roy et al 2008). Finally, Bankole and Westoff (1998) capitalize upon the Demographic and Healthy Surveys panel survey in Morocco in the 1990s to explore the consistency of answers to the set of fertility preferences contained within the questionnaire. They find that over time reproductive intentions is the most stable measure while ideal number of children was less stable over time, though exhibited greater stability in the aggregate than at an individual level. Further, they conclude that both measures contain varying degrees of measurement error.

Van Peer (2002) notes that when conceptualizing or studying fertility it is important to think about three distinct, yet related, dimensions of fertility: ideal family size, desired family size, and achieved family size. Ideal family size is driven by societal normative preferences while desired family size captures individual or personal

normative preferences. Each of these dimensions has both similar and different influences and, as Van Peer argues it, for individuals the three are often not equivalent. That's to say that ideal family size is not the same as desired family size and both are not the same as achieved fertility. Inherent in the theory van Peer puts forth is the call for a better understanding as well as measurement of each of these dimensions.

Indeed Van Peer argues for an ordering of these concepts such that ideal family size is greater than desired family size which in turn is greater than achieved family size; thus, realized fertility results in fewer than the ideal number of children. This ordering posited by Van Peer fails to consider situations in which the achieved family size is larger than either of the two other concepts, a scenario that is quite plausible in environments where controlling or limiting one's fertility is challenging, where societal and/or familial pressures exist to have a large family, or where polygamy or divorce is common and men father children with more than one woman. Mott and Mott (1985) postulate that intentions (and to a large degree they intermingle the concepts of intentions and preferences and reference them interchangeably) are normatively bound, formed individually, and not necessarily related to their partner's intentions or preferences.

Men's fertility preferences are given limited attention and much of the focus remains on power dynamics and negotiations within the couple and how any differences are resolved, either through compromise or dominance by one partner (Gipson & Hindin 2007; Snow et al 2013; Isiugo-Abanihe 1994; Derose et al 2002; Voas 2003). The research around fertility preferences has largely centered on women and when the male perspective is included it is both usually the exception rather than the norm and

very often still embedded within women-centered approaches to this kind of research (Dodoo et al 2008). When focusing on men solely in relation to their partners, the ability to determine men's true preferences, and how they may achieve these preferences (potentially outside a given partner/relationship), limits our understanding of fertility, particularly in places where polygyny is acceptable. Mott and Mott (1985) find in Nigeria, men whose partner's fertility preferences are lower than his own correct this imbalance through polygyny. Additionally, men's total fertility is more complicated to capture and measure than women's fertility. In surveys, extensive and detailed birth histories are collected from women while from men, a question about the number of living children they have is the most common measure. This may be problematic since men may have children with more than one woman, and totaling across the women may be more prone to error and mistakenly leaving out a child in the count may happen, or he may have fathered a child that he is unaware of.

One of the most ubiquitous and widely accepted measurement tools, the Demographic and Health Surveys (DHS) collects demographic and health information in over 90 countries and includes a specific set of questions in each questionnaire under the heading "Fertility Preferences" (DHS Program). It is these questions that many researchers utilize in an attempt to understand the many dimensions of fertility preferences among both women and men in these countries. However, given the demonstrated complexity of the concept and the many ways it can and has been measured, it remains unclear whether the set of questions included within a country's DHS is capturing 'true' fertility preferences and whether intentions falls under the umbrella of preferences or whether the two are distinct concepts. While an endeavor in qualitative data collection may be a way for researchers to begin to answer these

questions, it is also worthwhile to explore the data within already completed DHSs to uncover any contradictions or mismatches in the measurement of these concepts. Shedding light on these mismatches will help researchers to better understand the data within a DHS and its shortcomings as well as guide future exploration and research to fill this gap in understanding and measurement.

Data and Methods

Data come from the most recent Demographic and Health Survey in 38 countries in which 1) a survey was conducted in 2008 or later 2) a man's questionnaire was administered during that round and 3) all relevant variables were asked of all men. Of the 54 countries that have administered a survey since 2008, three countries were excluded because one or more focal variables were not asked during that round, five countries were excluded because the data was not available for public access and eight countries were excluded because the man's questionnaire was not administered during that round. The remaining 38 countries represent a wide variation of both regions in the world as well as in fertility indicators; total fertility rate (TFR) in these countries ranges from a low of 1.6 (Albania) to a high of 7.6 (Niger) and the modern contraceptive prevalence rate (mCPR) ranges from 4.6% in Guinea to 63.8% in Honduras.

Each DHS questionnaire administered to men contains a "Fertility Preferences" section, with approximately 5-15 questions, depending on the country. To assess the concept of ideal family size, the DHS asks "If you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?" of all men that have living children and "If you could choose exactly the number of children to have in your whole life, how

many would that be?" of all men who have no living children. Desire for a/another child is ascertained by asking him if he would like a/another child or if he would prefer to have any (more) children. Lastly, DHS collects information about the total number of living children a man reports he has.

Data used in this analysis are taken from all men ages 15-64 (age ranges for men vary across surveys) who were not undecided about their desire, or lack thereof, for a/another child; in other words, those that provided a definitive answer to wanting or not wanting another child and who provided a numeric answer for ideal number of children.

A mismatch, used neutrally in this analysis to describe a situation that is neither negative nor positive but one that warrants further exploration and investigation, is defined in two ways: (1) a man who says his ideal number of children is greater than the number of children he currently has but he states that he wants no more children or (2) a man who says his ideal number of children is fewer than the number of children he currently has but he states that he wants another child. Figure 1 illustrates the two possible inconsistencies in responses. On the left hand side, a respondent's ideal number of children is greater than his actual number of children. Of these respondents who fall into this category, they can then either respond that they want another child, consistent with the notion that a respondent will have children until he achieves their stated ideal number of children, or they can indicate that they do not want another child. It is this latter category of responses that will be classified as Mismatch 1 for this analysis. On the right hand side of the figure, a respondent has more children that their stated ideal number of children; some of these respondents then state that they want no more children, consistent with the notion that one would

not have more children that they think is ideal to have, while others state that they want another child. It is this latter category of contradictory responses that will be classified as Mismatch 2.

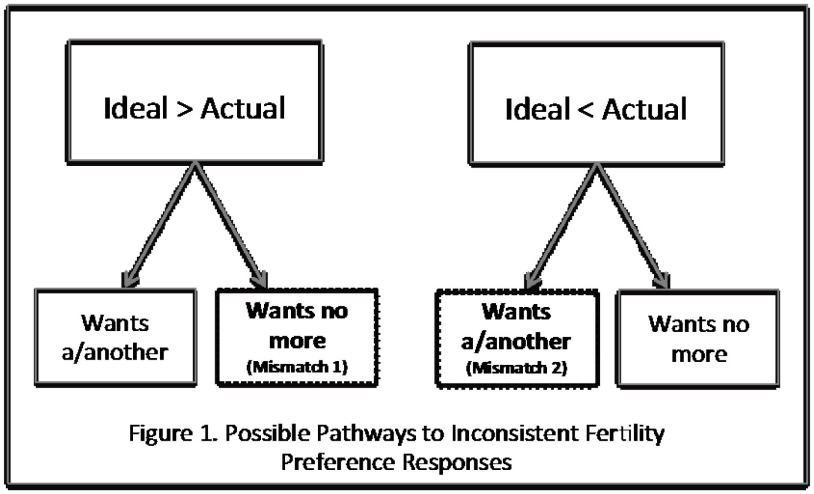

Figure 1. Possible Pathways to Inconsistent Fertility Preference Responses

For seven countries (Ethiopia, Kenya, Liberia, Madagascar, Niger, Pakistan, and Uganda), "up to God" or "God's will" is an explicit response category in response to ideal or preferred number of children. In these cases, respondents who provided this response were classified as having an ideal number greater than their actual number and a mismatch was declared when the respondent said they wanted no more children. In all remaining surveys "non-numeric response" is a response option. It is likely that many of those non-numeric responses are "up to God" or some version thereof, however it is impossible to disentangle those responses from any number of other non-numeric responses grouped into this response category. Therefore all "non-numeric" responses were dropped from this analysis. On average, 4.4 percent of men were dropped because they provided a non-numeric response, ranging from a low of 0.1 percent in Rwanda to a high of 22.7 percent in Maldives. (See Appendix Table A1 for more details).

Three components of the individual data in each country's DHS were used to create the mismatch variables: fertility preferences, measured as the number of children a man would like to have if he could choose the exact number, desire for a/nother child, and number of living children. For mismatch 1, all men whose fertility preferences exceeded the number of living children but there was no desire for a/nother child were classified as mismatched. For mismatch 2, all men whose number of living children exceeded fertility preferences and there was a desire for a/nother child were classified under this type of mismatch.

The country-level prevalence of each type of mismatch was estimated, accounting for the complex survey design. Meta-analytic techniques were used to provide a summary prevalence estimate for both types of mismatch for all 38 included countries. Because of the heterogeneity in prevalence across the 38 countries, a random effects model was used and the predictive interval, rather than a confidence interval, was estimated (Harris et al 2008). The predictive interval, or the interval in which future observations are likely to fall, is the preferred estimate when significant heterogeneity is present as it better accounts for the uncertainty in the mean estimate where variability exists (Smith 2012; Harris et al 2008).

Results

Table 1 describes some of the components of the mismatch definition by country. The mean number of currently living children across all countries is 2.2, with a narrow range from 1.1 children in Armenia to 3.3 in Niger. The average preferred family size varies widely, from a low of 2.2 children in Nepal to a high of 11.1 children in Niger, with an average preferred family size across the 38 countries of 5.0

children. On average, 80 percent of men are currently below their ideal family size while an average of 9.5 percent of men are currently in excess of their fertility preferences. 1 in 5 men want no more children, ranging from a low of 1.6 percent of men in Niger to high of 43.5 percent of men in Maldives.

Table 1. Description of Mismatch Components by Country

	DHS Survey Year	N	Average Current Number of Children	Average Preferred Family Size	% of Men Below Preferred Family Size	% of Men Above Preferred Family Size	% of Men who Want No More Children
Albania	**2008/09**	**1488**	**1.3**	**2.7**	**65.4**	**6.0**	**38.6**
Armenia	2010	656	1.1	2.6	78.3	2.6	27.8
Benin	**2011/12**	**2746**	**3.0**	**6.1**	**79.2**	**13.3**	**17.7**
Burkina Faso	2008	4276	2.7	6.6	89.0	6.5	10.0
Bolivia	**2010**	**4166**	**2.3**	**2.9**	**59.3**	**23.3**	**41.8**
Burundi	2010/11	2295	2.4	4.0	71.9	20.7	22.2
Cambodia	**2010**	**4597**	**1.6**	**3.2**	**75.6**	**7.3**	**29.3**
Congo	2011	4579	3.0	7.6	87.5	8.3	12.9
Cote D'Ivoire	**2012**	**2222**	**2.3**	**6.1**	**89.3**	**6.5**	**9.9**
Cameroon	2013/14	3225	2.2	6.6	88.6	6.9	11.8
Comoros	**2011/12**	**955**	**1.9**	**5.6**	**86.8**	**6.5**	**10.5**
Ethiopia	2011	6900	2.2	5.7	87.0	7.3	15.5
Gabon	**2012**	**2523**	**2.6**	**5.8**	**85.2**	**9.8**	**13.5**
Ghana	2008	2306	2.1	5.0	83.6	8.9	19.1
Guinea	**2012**	**1790**	**2.5**	**7.6**	**93.5**	**4.1**	**4.0**
Guyana	2009	1616	1.6	3.4	71.6	10.8	27.9
Honduras	**2011/12**	**4483**	**2.4**	**3.6**	**68.9**	**15.4**	**28.7**
Indonesia	2012	7382	2.3	3.0	58.0	13.7	41.2
Kenya	**2008/09**	**1689**	**2.0**	**4.6**	**78.4**	**11.2**	**22.4**
Kyrgyz Republic	2012	1194	1.6	4.2	85.2	2.1	16.5
Liberia	**2009/10**	**2162**	**2.4**	**5.5**	**84.5**	**7.2**	**16.1**
Lesotho	2013	1356	1.3	3.4	83.6	7.6	20.6
Mali	**2008/09**	**2256**	**2.8**	**8.1**	**88.2**	**7.1**	**8.5**
Madagascar	2010	5231	2.4	5.4	81.5	7.7	25.4
Maldvies	**2009**	**1150**	**3.2**	**3.9**	**64.6**	**12.5**	**43.5**
Malawi	2012/13	4014	2.4	4.1	75.6	13.9	25.5
Mozambique	**2011**	**2236**	**2.6**	**5.8**	**87.4**	**5.6**	**17.6**
Nigeria	2013	7600	1.8	7.9	93.5	3.0	6.6
Niger	**2011**	**2287**	**3.3**	**11.1**	**96.6**	**1.8**	**1.6**
Namibia	2012	1024	1.4	3.9	81.7	6.5	13.3
Nepal	**2013**	**2530**	**1.6**	**2.2**	**57.2**	**22.5**	**37.8**
Pakistan	2012/13	2804	3.2	4.6	64.6	17.4	35.4
Rwanda	**2010/11**	**3209**	**2.0**	**2.9**	**67.6**	**24.1**	**30.9**
Sierra Leone	2013	3556	2.3	5.7	88.5	5.9	12.2
Timor-Leste	**2009/10**	**1718**	**2.0**	**5.1**	**85.8**	**3.5**	**12.4**
Tanzania	2009/10	1015	1.9	5.3	88.2	7.0	9.7
Uganda	**2011**	**1236**	**2.9**	**5.9**	**82.7**	**11.2**	**17.0**
Zimbabwe	2010/11	3420	1.6	4.4	87.0	4.7	16.7

Figure 2 shows the estimated national prevalence of mismatch 1, in which the respondent's ideal number of children is greater than his actual number of children but the respondent does not want another child, for each of the 38 countries as well as a summary prevalence estimate from the meta-analysis. Among then men, there is a fair amount of variability in the prevalence estimates, but on average across all 38 countries, the prevalence of this mismatch is 12.1% of male respondents. Among the men, the prevalence ranges from a low of 2.29% in Niger to more than 1 in 4 men who say they want no more children even though they have fewer children than they respond is ideal 29.75% in Armenia.

Figure 2. Prevalence of Mismatch 1: Ideal > Actual but Wants No More Children

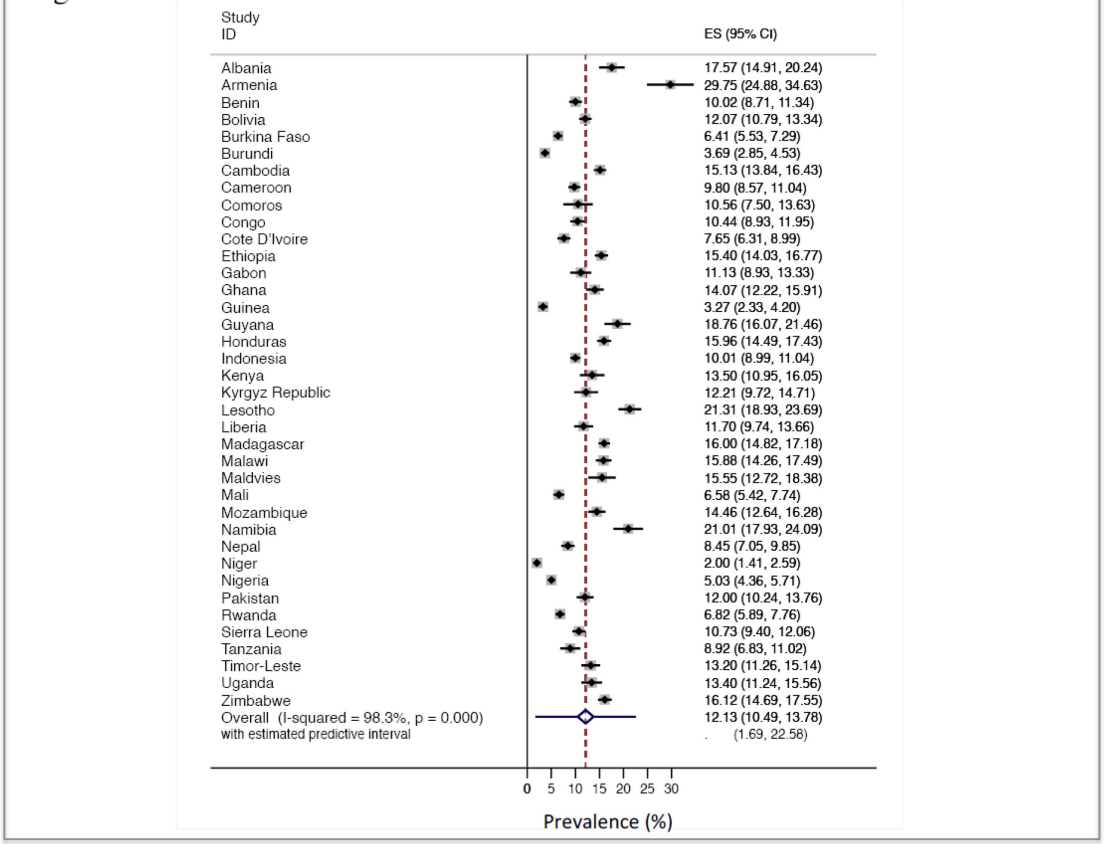

Table 2 shows the regional prevalence estimates of mismatch 1, where men's current number of children is fewer than the preferred number of children but they report wanting no more children. There are large regional variations in the prevalence of men whose preferred family size is smaller than their actual family size but who want no more children. Sub-Saharan Africa has the lowest level of mismatch, on average, just below 11 percent of men. South, Southeast, and Central Asia have prevalence estimates right around the global average, while North Africa/West Asia/ Europe estimates far exceed the other regions, where nearly 1 in for men are mismatched. The two countries in this region, Albania and Armenia, both have very low fertility current fertility, small average preferred family sizes, and large portions of men who say they do not want any more children.

Table 2. Regional Estimates of Mismatch 1

Region	N	Mismatch 1 Estimate
Sub-Saharan Africa	26	10.92
North Africa/West Asia/Europe	2	23.48
South, Southeast, Central Asia	7	11.80
Latin America and Caribbean	3	15.45
ALL	38	12.13

Figure 3 displays the country-level prevalence estimates stratified by sex for mismatch 2, in which respondents' actual family size is greater than their ideal family size but they report wanting another child. Again, there is variation across the 38 countries but the range of prevalence estimates is smaller here than the range seen for mismatch 1. The average prevalence estimate from the meta-analysis is 5.0% for men, making this mismatch much less common among men than the prevalence of mismatch 1. Among the men, the lowest prevalence is found in the Kyrgyz Republic (1.40%) and the highest in Burundi (10.39%).

Figure 3. Prevalence of Mismatch 2: Ideal < Actual but Wants Another Child

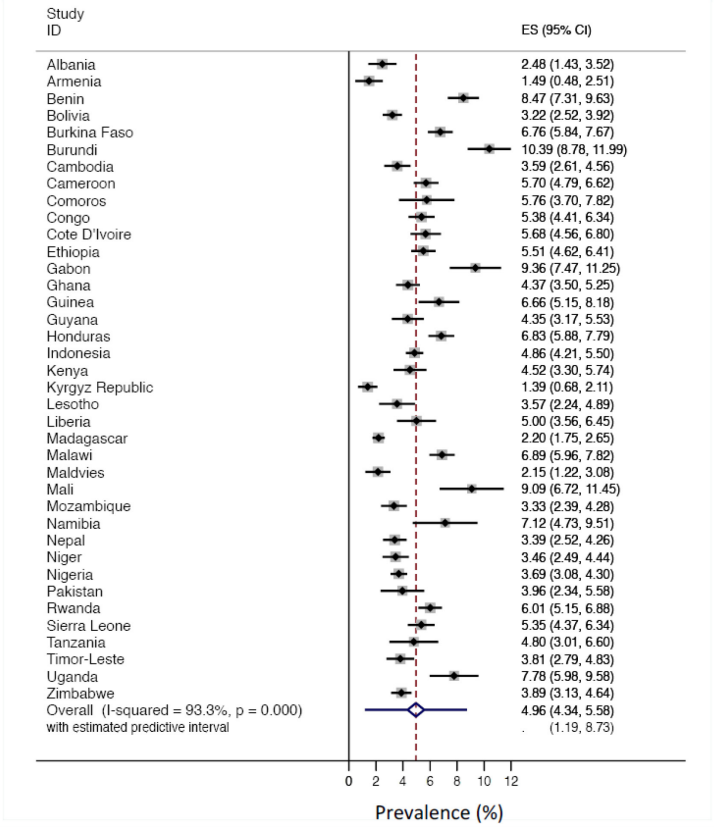

Table 3 presents the regional prevalence estimates for mismatch 2. Unlike mismatch 1 where sub-Saharan Africa's prevalence was below the global average and the lowest of the five included regions, sub-Saharan Africa has the highest estimated prevalence of mismatch 2, in which men whose actual number of children exceeds their fertility preferences but they say they want another child. Less regional variation is seen in this type of mismatch, with the lowest prevalence in North Africa/West Asia/Europe, the region that saw the highest prevalence of mismatch 1.

Table 3. Regional Estimates of Mismatch 2		
Region	N	Mismatch 2 Estimate
Sub-Saharan Africa	26	5.70
North Africa/West Asia/Europe	2	1.98
South, Southeast, Central Asia	7	3.48
Latin America and Caribbean	3	4.79
ALL	38	4.96

Discussion and Conclusions

Both types of mismatches taken together, on average more than 17% of men across the 38 countries provided answers that warrant further exploration as to the meaning and measurement of fertility preferences. Both mismatches had large variations across the 38 countries as well as by region. Countries in sub-Saharan Africa have the lowest percentage of men who do not want another child despite their family size being smaller than they prefer while the region has the largest percentage of men who want another child beyond their current family size that exceeds their fertility preference. Meanwhile, North Africa/West Asia/Europe has the highest prevalence of mismatch 1 and the lowest levels of mismatch 2. Taken together, this may suggest that men in countries that have high fertility and high fertility preferences tend to exceed their preferences while men in countries with low fertility tend to fall short of meeting their fertility preferences.

Mismatch 1, that is men whose ideal number of children is greater than their actual number of children but who want no more children, is more prevalent than the mismatch in which a respondent's ideal number of children is less than their actual number but who want more children. The first type of mismatch may not be problematic and it may be that men decide that it is not possible to have their ideal

number of children within their economic and/or social constraints. The DHS, however, does not follow up with questions to ascertain reasons for not wanting another child; rather these questions are asked in the context of contraceptive use. Thus it is unclear whether some of the mismatch results from measurement error or, importantly, what information "ideal family size" is conveying or how the respondent is internalizing the question. Mismatch 2, in men are stating that they would like more children than they think is ideal, points quite directly to a need for understanding and further refinement of both the concept of ideal family size concept as a dimension of fertility preferences as well as desire for another child as a measurement of intentions, and particularly the two together in capturing and reflecting an umbrella concept of fertility preferences.

It is important to note that, while for the majority of respondents in each of these surveys we do not find contradictory responses, the cross-sectional nature of these surveys provides only a snapshot in time of intentions (wanting another child) and that some of these respondents may classify as mismatched at another point in time. Previous research has found that fertility preferences may fluctuate to some degree but are largely stable over time (Yeatman et al 2013; Roy et al 2008; Bankole & Westoff 1998). However, fertility intentions may be more prone to fluctuations (Bankole & Westoff 1998) and so men mismatched in this analysis may not be mismatched in the future. Thus, while the need to further explore the meaning and refine the measurement of fertility preferences is highlighted by the prevalence of these mismatches in DHS data, the need to do so is by no means exclusive to the subset of men classified as mismatched in this analysis.

Another limitation of this study is the "non-numeric" fertility preferences responses. In this analysis, those men who provided a non-numeric response that was not explicitly "up to God" were dropped, as the meaning would be difficult to interpret. Dropping these men may have introduced some measure of bias into the analysis and so the results should be interpreted with caution.

Previous literature and research has demonstrated the complexity of fertility preferences as a concept and measured construct (Bongaarts 1990; Casterline & El-Zeini 2007; Yeatman et al 2013; Bankole & Westoff 1998). Given this complexity, it is likely that the way in which we are measure the multiple dimensions of fertility preferences may not be capturing 'true' fertility preferences and may lead to contradictions within the data. Indeed within the most recent DHS in 38 countries exists varying degrees of contradictions or mismatches within the data, with nearly 1 in 3 men in Armenia providing answers that warrant further exploration into the meaning behind the mismatch in order to be able to tell a more complete story about fertility preferences. This challenges researchers to think through and be mindful of the implications of combining measurements of the multiple dimensions of fertility preferences to tell a story and to urge them to investigate what mismatches within their data like those found in this analysis may mean. Additionally, these findings highlight the continued need for further exploration, both quantitative and qualitative, into what the fertility preference concept means in a given setting and among men, as well as how best to operationalize and measure it. Delving further into the kinds of inconsistent responses within the questions contained in the DHS found during this analysis, a next step is to explore what factors, either at an individual level or a national level, are associated with the mismatch to provider further quantitative

insight in to some of the underlying motivators influencing these contradictions in responses. Additionally, a qualitative exploration into the various influences of fertility preferences among men may be one way to capture the contextual variation of preferences as well as lend new insight into factors that may influence men that have not been previously identified by the limited literature and research on men.

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Appendix

Table A1. Percentage of Men Dropped from Analysis Due to "Non-Numeric" Response Option by Country

	DHS Survey Year	N	Dropped from Analysis (%)
Albania	2008/09	1488	2.62
Armenia	2010	656	2.90
Benin	2011/12	2746	4.88
Burkina Faso	2008	4276	3.04
Bolivia	2010	4166	2.26
Burundi	2010/11	2295	1.50
Cambodia	2010	4597	1.06
Congo	2011	4579	5.12
Cote D'Ivoire	2012	2222	9.70
Cameroon	2013/14	3225	6.41
Comoros	2011/12	955	5.08
Ethiopia	2011	6900	8.03
Gabon	2012	2523	5.94
Ghana	2008	2306	1.12
Guinea	2012	1790	9.49
Guyana	2009	1616	2.53
Honduras	2011/12	4483	2.18
Indonesia	2012	7382	12.36
Kenya	2008/09	1689	2.31
Kyrgyz Republic	2012	1194	4.44
Liberia	2009/10	2162	0.24
Lesotho	2013	1356	1.09
Mali	2008/09	2256	18.69
Madagascar	2010	5231	0.27
Maldvies	2009	1150	22.70
Malawi	2012/13	4014	1.41
Mozambique	2011	2236	1.39
Nigeria	2013	7600	5.22
Niger	2011	2287	5.65
Namibia	2012	1024	0.99
Nepal	2013	2530	0.10
Pakistan	2012/13	2804	2.07
Rwanda	2010/11	3209	0.09
Sierra Leone	2013	3556	4.31
Timor-Leste	2009/10	1718	3.26
Tanzania	2009/10	1015	3.13
Uganda	2011	1236	0.78
Zimbabwe	2010/11	3420	1.15

CHAPTER 3: NATIONAL-LEVEL FACTORS AND INCONSISTENT FERTILITY PREFERENCES AMONG MEN

Background

Fertility preferences as a concept and measured construct has no single definition within the literature and debates between the measurement of and the merits between preferences, intentions, and desires are prevalent (Casterline & El-Zeini 2007; Yeatman et al 2013; Bankole & Westoff 1998). Ryder & Westoff (1971) conclude that fertility preferences are the most direct attitudinal measure and thus the most fundamental measure. Yet, they argue, preferences are still subjectively measured and that assessments of constraints to reproduction (biological, social, economic) are often reflected in survey measures, hindering the ability of researchers to capture "true" fertility preferences (Ryder & Westoff 1971).

The research is mixed as to whether there are gender differentials in fertility preferences (Snow et al 2013; Mason & Taj 1987; Bankole 1995; Derose et al 2002) and further mixed even among those who conclude that gender differentials are present between those that find that men nearly uniformly have preferences for larger families (Bankole & Singh 1998) and those that find that women have preferences for larger families in settings where women are quite powerless (Eberstadt 1981; Cain et al 1979). Further, much of the focus remains on power dynamics and negotiations within the couple and how any differences are resolved, either through compromise or dominance by one partner (Gipson & Hindin 2007; Snow et al 2013; Isiugo-Abanihe 1994; Derose et al 2002; Voas 2003). Men's preferences are given limited attention; much of the research around fertility preferences has centered on women and when the male perspective is included it is both usually the exception rather than the norm

and very often still embedded within women-centered approaches to this kind of research (Dodoo et al 2008). By focusing on men in relation to their partners, the ability to determine men's true preferences, and how they may achieve these preferences (potentially outside a given partner/relationship), limits our understanding of fertility, particularly in places where polygyny is acceptable.

One of the most ubiquitous and widely accepted measurement tools, the Demographic and Health Surveys (DHS) collects demographic and health information in over 90 countries and includes a specific set of questions in each questionnaire under the heading "Fertility Preferences" (DHS Program). It is these questions that many researchers utilize in an attempt to understand the many dimensions of fertility preferences among both women and men in these countries. However, given the complexity of the concept and the many ways it can and has been measured, it remains unclear whether the set of questions included within a country's DHS is capturing 'true' fertility preferences. Thus, it is both possible and probable that respondents provide internally inconsistent responses to this set of questions. What has not been researched are the factors that are associated with or motivating these inconsistent, or mismatched, responses. An exploration of explanatory factors that are associated with these mismatched responses can provide insight into both how respondents are considering the questions that are asked of them as well as whether there may be measurement error in the set of questions widely used to capture fertility preferences, and if so, where the source of that measurement error may be. This paper uses national-level DHS data to explore the factors associated with mismatch among men in 38 countries.

A mismatch in fertility preferences in the analyses that follow is defined in two ways: (1) a man who says his ideal number of children is greater than the number of children he currently has but he states that he wants no more children or (2) a man who says his ideal number of children is fewer than the number of children he currently has but he states that he wants another child. Figure 1 illustrates the two possible contradictions in responses. On the left hand side, a respondent's ideal number of children is greater than his actual number of children. Of these respondents who fall into this category, they can then either respond that they want another child, consistent with the notion that a respondent will have children until he or she achieves their stated ideal number of children, or they can indicate that they do not want another child. It is this latter category of responses that will be classified as Mismatch 1 for this analysis. On the right hand side of the figure, a respondent has more children that their stated ideal number of children; some of these respondents then state that they want no more children, consistent with the notion that one would not have more children that they think is ideal to have, while others state that they want another child. It is this latter category of contradictory responses that will be classified as Mismatch 2.

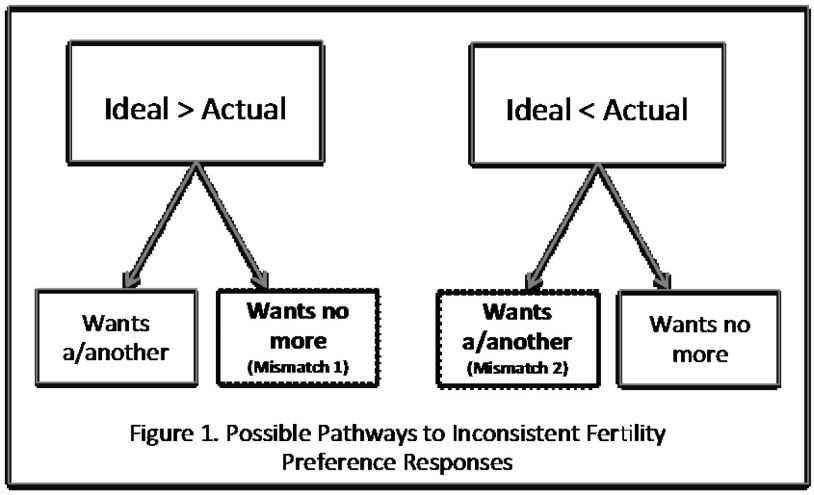


Figure 1. Possible Pathways to Inconsistent Fertility Preference Responses

Conceptual Framework

The conceptual framework for this paper draws heavily on the framework developed recently by the REPRO Project, a collaboration between researchers at demographic institutes across Europe. The researchers argue that fertility behaviors must been seen as the result of a decision-making process that is made at the individual (micro) level but within the context of macro level influences (Philipov et al 2009). These macro influences include a number of economic indicators that provide an indication as to the health of various dimensions of the economy. The stated goal of the project is to better understand what the researchers term the "fertility gap", that is the gap between preferences and actual, realized fertility, among European countries where low fertility means that actual fertility is lower than preferences through the lens of the interplay between the micro and macro environment; however this mismatch can and should be more generalized as well as investigated in countries with varying fertility levels. Their working conceptual framework links macro-level conditions to micro-level decision-making processes to fertility behavior; the macro level connections as well as the micro level connections must be researched and understood both

individually and together in order to provide a more complete picture relating fertility preferences to fertility outcomes.

Figure 2 shows the conceptual framework guiding the analysis that follows. In this framework, fertility preferences are influenced by macro indicators of the social and economic environment, such as infant mortality and HIV prevalence, as well as by micro indicators such as relationship and individual characteristics. These influences shape fertility preferences, which in turn, can result in a mismatch classification.

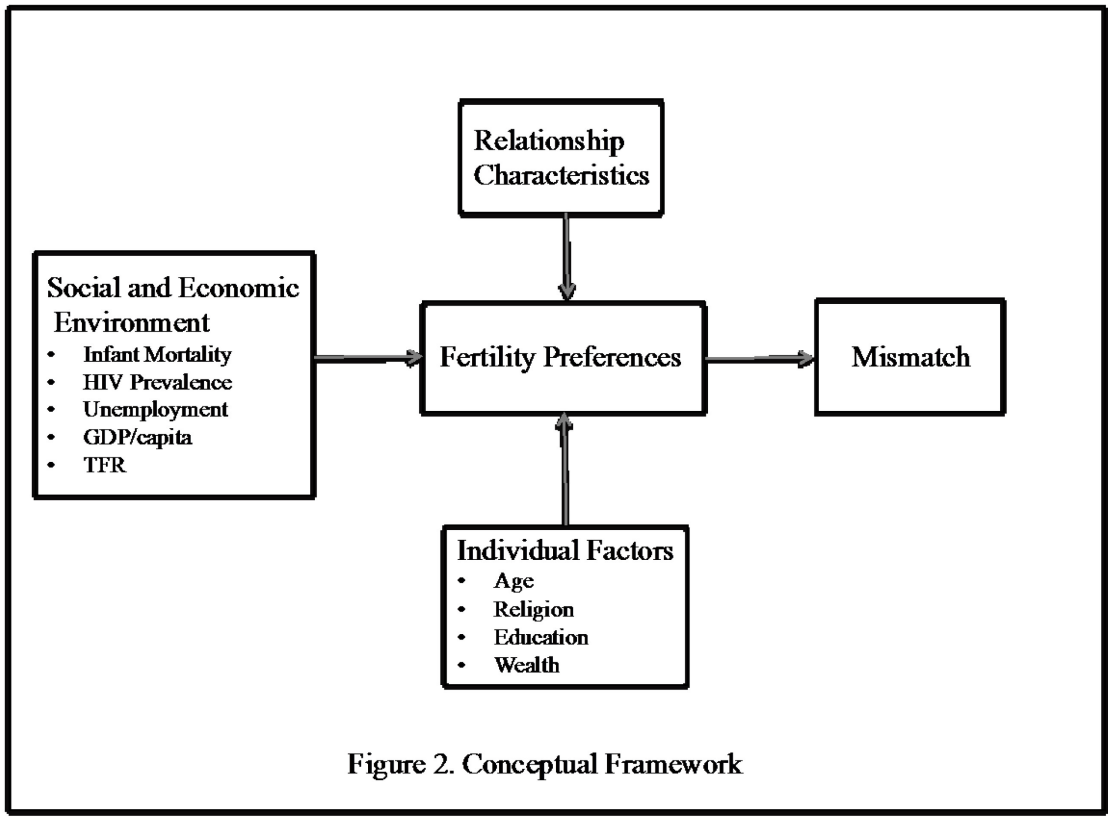


Figure 2. Conceptual Framework

Several studies have hypothesized, tested, and found evidence for the relationship between macro level indicators of socioeconomic development, either at the community or national level, and sexual and reproductive health outcomes such as fertility preferences, pregnancy intentions, and contraceptive use (Lesthaeghe et al, 1985; Lesthaeghe, 1989; Casterline, 1983; Chiao et al, 2011; Stephenson et al, 2008;

Grady et al 1993; Kravdal, 2002). These studies look at a number of variables that operate at the macro level, such as strength of the labor market and socioeconomic status, and find varying degrees of evidence for the inclusion of these types of variables in the exploration of pathways affecting sexual and reproductive health outcomes. For example, in exploring the relationship between schooling and fertility, Lesthaeghe et al (1985) find that the relationship operates as a function of macro variables that capture regional patterns of both socioeconomic development and culture. Using the conceptual framework laid out above, an ecological analytic approach will be used to test the hypothesized relationship between the social and economic macro level variables and a fertility preference mismatch.

Factors Hypothesized to be Associated with a Mismatch in Fertility Preferences

HIV Prevalence

As HIV and fertility research become increasingly intertwined, there has been some focus on the interplay between HIV and fertility preferences, particularly in the face of diagnosis. Using mixed methods, Yeatman examines the effect of a HIV diagnosis on fertility preferences among both women and men in Malawi. Among men she finds in both the quantitative and qualitative analysis that an HIV diagnosis reduces fertility desires, specifically that once the diagnosis is received, men plan to have fewer children or stop having them. In the qualitative analysis, Yeatman finds that the reason for this is the anticipation of death from the HIV diagnosis, rendering the man unable to care for any additional children he would have following the diagnosis as well as unable to benefit from the pride of having children or the enjoy the old age benefits afforded when a man has children (Yeatman 2009). Bonnenfant et al (2012) explore this relationship among both men and women in Ethiopia and, among men, find that HIV status is significantly associated with a desire to stop childbearing.

Delving further into this relationship, the researchers find that HIV positive men who had HIV negative partners were more likely to want no more children but this result was not found among HIV concordant couples nor among discordant couples in which the man was HIV negative and his partner was HIV positive.

Infant Mortality Rate

Much of the literature, particularly that focusing on the demographic transition, has shown that declining child mortality rates leads to a decline in fertility (Coale 1984; Doepke 2004; Angeles 2010). The prevailing explanations include the child replacement hypothesis, that is that parents try to replace children who die, and the child survival hypothesis, that parents try to produce enough children to ensure that the intended number of children survive (Scrimshaw 1978; Ben-Porath 1976). Thus, when child mortality is on the decline, parents worry less about the survival of their children and can reduce the number of children that they both intend to have and that they have who then survive, providing parents greater control over their fertility preferences.

Labor Force Participation

While the association between women's labor force participation and fertility has been the main focus of the literature, the economic underpinnings of the association between general unemployment and fertility operate differently. Researchers suggest that temporary unemployment may reduce the opportunity cost of having a child and thus higher fertility may follow (although this still has undertones of a focus solely on women's participation in the labor force) but that persistent unemployment has the opposite effect. In economies where there is consistent high unemployment, fertility is reduced following the reduced individual and household wages that result from unemployment (Adsera 2005).

Kravdal (2002) examines the impact of unemployment on fertility for both men and women at the individual and aggregate level in Norway and finds that at an individual level unemployment has a negative effect on fertility among men but not among women, while unemployment at the aggregate-level has a similar negative effect on fertility among both men and women. Although just among women, Adsera (2009) looks at the relationship between unemployment at the aggregate level and the relationship to fertility in 13 European countries and finds that high, persistent unemployment leads to delays in childbearing and delays in second-order children.

Finally, Easterlin (1969; 1973) posited that the relationship between income and fertility is dependent on relative income, that is that couples aim to create a higher standard of living for their family than they had growing up. Thus, if the economy is doing well and jobs are readily available, unemployment is low, couples will expect that they will be able to achieve the standard of living they desire while still being able to have as many children as they desire. This leads to higher fertility in the aggregate than would be seen in a situation where high unemployment and poor economic performance signaled to a couple that they will be unable to meet their aspirational standard of living.

GDP/Capita

Much of the research examining the relationship between GDP/capita and fertility has focused on the one-directional association from lowering of fertility to an increase in GDP/capita (Ahituv 2001). However, scholars have also suggested a bidirectional relationship between the two--if GDP/capita is an indication of the health of the economy and thus an indication about potential and future earnings and income, then

it should follow that GDP/capita may influence fertility preferences. Wang et al (1994) find that there is an endogenous relationship between output growth and fertility decisions and that various economic-related shocks are important in explaining movement in the fertility rate.

Objectives

The objective of the analyses that follow is to explore the relationship between internally inconsistent fertility preferences in the DHS and these national level indicators of development and health. Five main hypotheses are put forth:

(1) Higher HIV prevalence will reduce the desire for another child, leading to higher mismatch 1 and lower mismatch 2

(2) Higher IMR will increase the desire for another child, leading to lower mismatch 1 and higher mismatch 2

(3) Higher labor force participation will increase the desire for another child, leading to lower mismatch 1 and higher mismatch 2

(4) Higher GDP/capita will increase the desire for another child, leading to lower mismatch 1 and higher mismatch 2

(5) Much of mismatch 1 will be explained by these factors while very little of mismatch 2, which is more indicative of the possibility of measurement error, will be explained by these factors

Methods

Data come from the DHS in 38 countries that have conducted a survey at least once since 2008, administered the man's questionnaire during that round and asked all fertility preference questions of men during that round. Of the 54 countries that have

administered a survey since 2008, three countries were excluded because one or more focal variables were not asked during that round, five countries were excluded because the data was not available for public access and eight countries were excluded because the man's questionnaire was not administered during that round. The weighted prevalence for each type of mismatch was estimated for each of the 38 countries, using complex design procedures to account for the multistage sampling survey design of the DHS.

National level HIV prevalence estimates among adults 15-49 come from the World Health Organization's 2009 and 2013 estimates and UNAIDS' 2011 estimates. Each survey year is mapped to the closest HIV prevalence estimate, with preference given to the next closest year, rather than the previous closest year. For example, surveys from 2010 were mapped to the 2011 estimates rather than the 2009 estimates.

Infant mortality rate (IMR) estimates, or the number of infants dying before age one per 1000 live births, were obtained from the World Bank. IMR data is released every year and so mapped directly to each survey year for the 38 countries.

Participation in the labor force is measured as the employment to population ratio among those 25 years and older and data are obtained from the Human Development Reports, which are released every year with the exception of 2012. For surveys from 2012, data come from the 2013 report.

GDP per capita data, or the total value of all goods produced and services rendered in a year by population size, are taken from the World Bank, which releases the data for

all included countries every year. A skewness and kurtosis test for normality found that GDP per capita among these 38 countries is not normally distributed, so the log of GDP/capita is used in the analysis.

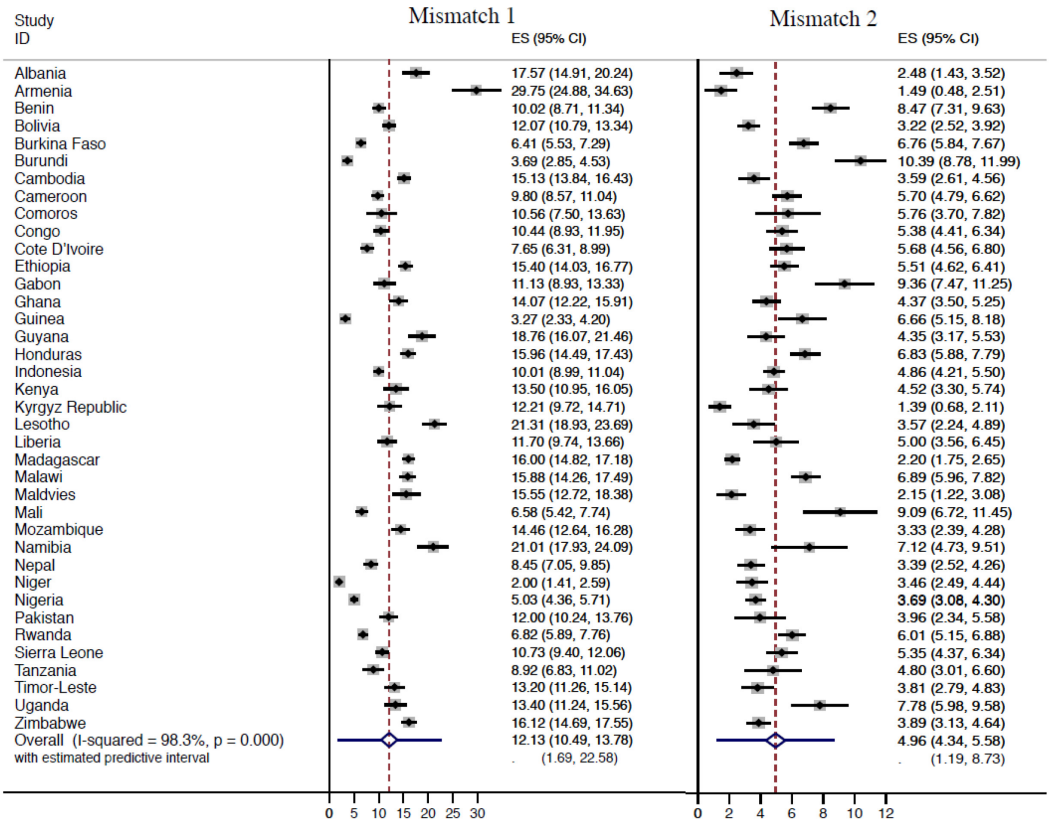
Meta-regression analyses using linear random-effects models were used to explore the associations between the four national level indicators and both types of mismatch. Meta-analytic techniques were employed because the prevalence estimates for each country are the aggregate of individual data. Each national level covariate was tested individually and then all together in a fully adjusted multivariate model using residual maximum likelihood estimation.

All analyses were conducted in Stata 14.0.

Results

Figure 3 shows the prevalence of mismatch 1 and mismatch 2 for each of the 38 study countries as well as a summary prevalence estimate for each.

Figure 3. Estimated Prevalence of Mismatch 1 (ideal < actual but wants no more children) and Mismatch 2 (ideal > actual but wants another child) among men in 38 DHS countries



On average across all 38 countries, the prevalence of mismatch 1 is 12.1% of male respondents, though considerably variability across counties exists. The prevalence ranges from a low of 2.29% in Niger to 29.75% in Armenia. Turning to mismatch 2, again, there is variation across the 38 countries but the range of prevalence estimates is smaller here than the range seen for mismatch 1. The average prevalence estimate from the meta-analysis is 5.0% for men, ranging from a low of 1.40% in the Kyrgyz Republic to a high of 10.39% in Burundi.

Table 1. provides the HIV prevalence, infant mortality rate (IMR), labor force participation, and Gross Domestic Product (GDP)/capita for the 38 survey countries.

Table 1. Estimates of HIV Prevalence, Infant Mortality Rate (IMR), Labor Force Participation, and Gross Domestic Product (GDP)/capita by Country

Country	DHS Survey Year	HIV Prevalence (%)	IMR (per 1000 live births)	Labor Force Participation (%)	GDP/Capita (US $)
Albania	2008/09	0.10	16	46.2	4,242
Armenia	2010	0.15	16	47.3	3,125
Benin	2011/12	1.20	59	80.7	751
Bolivia	2008	0.30	38	61.4	1,696
Burkina Faso	2010	1.05	70	86.0	593
Burundi	2010/11	1.30	60	88.5	233
Cambodia	2010	0.75	37	86.7	783
Cameroon	2011	4.60	64	80.3	1,205
Comoros	2012	0.10	59	62.4	767
Congo	2013/14	2.50	86	78.6	484
Cote D'Ivoire	2011/12	3.00	74	73.1	1,244
Ethiopia	2011	1.40	48	84.0	351
Gabon	2012	4.45	40	63.2	10,930
Ghana	2008	1.60	56	65.2	1,234
Guinea	2012	1.55	67	79.0	493
Guyana	2009	1.30	33	57.8	2,593
Honduras	2011/12	0.70	20	67.3	2,308
Indonesia	2012	0.40	25	70.7	3,551
Kenya	2008/09	6.00	55	73	771
Kyrgyz Republic	2012	0.30	23	70.7	1,178
Lesotho	2009/10	22.50	79	54.1	1,083
Liberia	2013	1.10	54	72.0	454
Madagascar	2008/09	0.60	46	83.3	417
Malawi	2010	11.25	53	92.0	360
Maldives	2009	0.10	12	57.3	6,209
Mali	2012/13	0.90	79	65.5	706
Mozambique	2011	11.30	68	90.1	510
Namibia	2013	14.30	35	63.5	5,693
Nepal	2011	0.30	35	86.4	694
Niger	2012	0.60	62	66.0	395
Nigeria	2013	3.20	74	61.7	1,376
Pakistan	2012/13	0.10	70	56.3	1,264
Rwanda	2010/11	2.90	43	92.3	519
Sierra Leone	2013	1.60	107	76.7	679
Tanzania	2009/10	5.70	43	78.0	525
Timor-Leste	2009/10	0.20	50	62.8	876
Uganda	2011	7.20	49	86.9	441
Zimbabwe	2010/11	14.90	59	89.0	820

Notes:
HIV Prevalence among adults 15-49 from WHO (2009 and 2013) and UNAIDS (2011)
IMR per 1000 live births from World Bank
Labor Force Particiaption is the employment to population ratio (% 25 years and older) from United Nations Human Development Reports
GDP per capita from World Bank

HIV prevalence ranges from a low of 0.1% in multiple countries (Albania, Maldives, Pakistan, and Comoros) to a high of 22.5% in Lesotho. The mean HIV prevalence across the 38 countries is 3.5%. The infant mortality rate varies widely, with the

lowest level found in the Maldives (12 deaths per 1000 live births) and the highest level in Sierra Leone (107 deaths per 1000 live births) while the mean IMR is 52 per 1000 live births. The range for labor force participation is 46.2% in Albania to 92.3 in Rwanda and the mean is 72.5%. The lowest GDP per capita is found in Burundi ($233.2) while the highest is in Gabon ($10,929.9) -- the average GDP per capita across the 38 countries is $1,619.8.

Figures 4 and 5 show the relationship between the four national-level indicators and the two types of mismatch for the 38 study countries – each bubble on a graph represents one country and the size of the bubble is proportional to the standard error of the mismatch prevalence estimate.

Figure 4. Relationship between HIV Prevalence, IMR, Labor Force Participation, and Log GDP/capita and Mismatch 1 (ideal < actual but wants no more children)

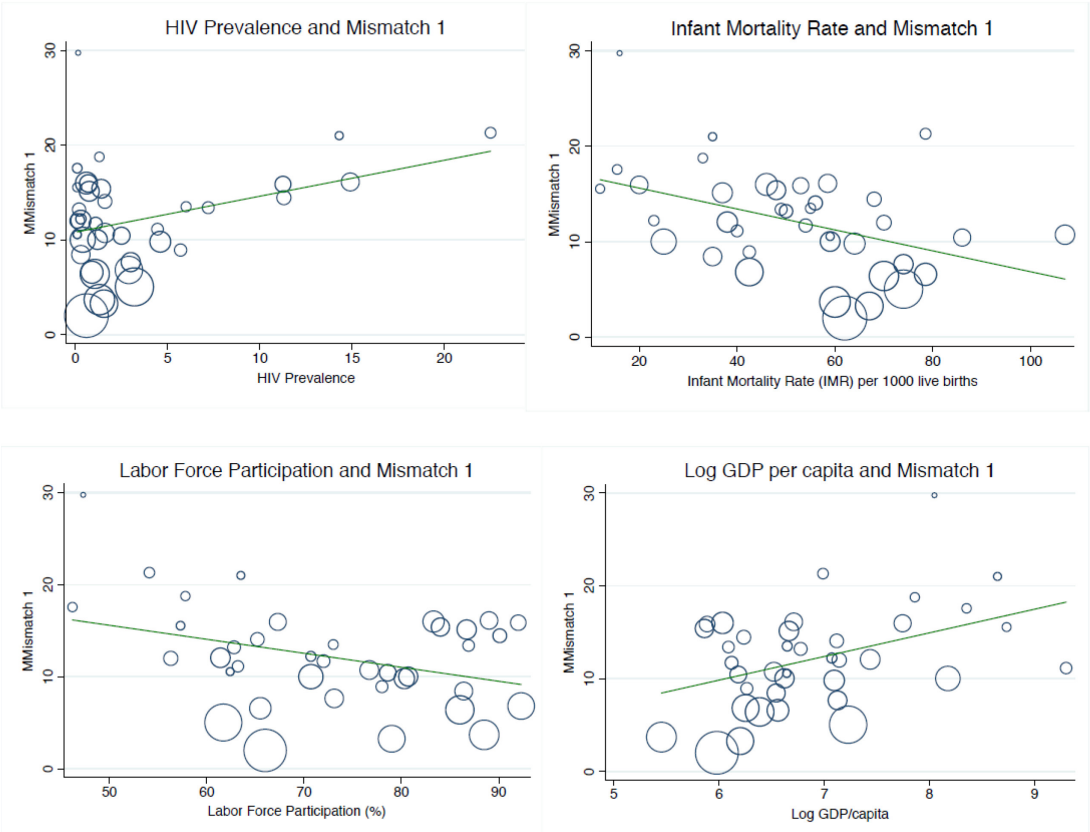
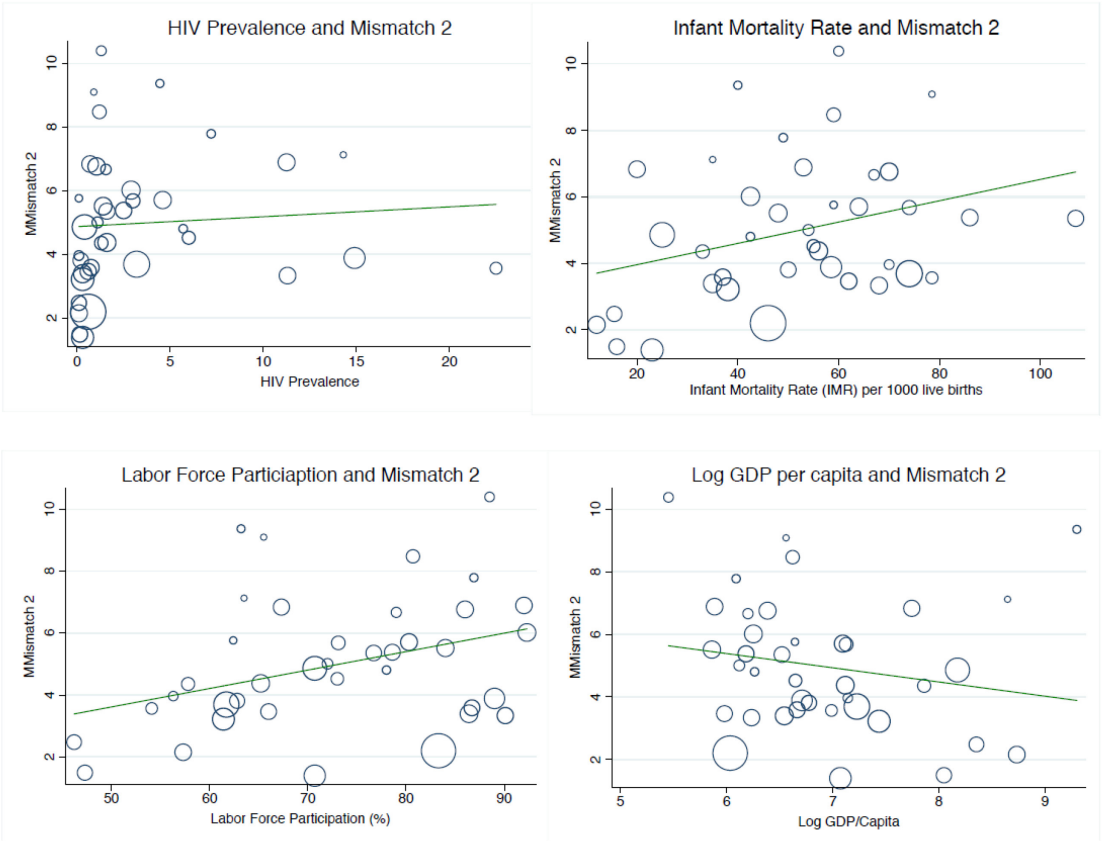


Figure 5. Relationship between HIV prevalence, IMR, labor force participation, and Log GDP/capita and Mismatch 2 (ideal > actual but wants another child)



There is a generally positive relationship between HIV prevalence and both types of mismatch while the infant mortality rate trends negative with mismatch 1 and trends positive with mismatch 2. There is a negative relationship between labor force participation and mismatch 1 while the relationship is positive with mismatch 2. Log GDP trends negative in mismatch 1 and positive in mismatch 2.

Mismatch 1: Ideal > Actual but Wants No More Children

Table 2 presents the result of the meta-regression analysis for mismatch 1.

Table 2. Associations Between National Level Indicators and Mismatch 1 (Ideal > Actual but Wants No More Children) Among Men: Results from Meta-regression Analysis

	Mismatch 1 (N=38)				
	Unadjusted			Adjusted	
	β	p	R^2	β	p
HIV	0.38	0.03	0.12	0.55	<0.001
IMR	-0.11	0.01	0.17	-0.12	<0.001
Labor Force	-0.15	0.03	0.10	-0.14	0.07
Log GDP/Capita	2.55	0.01	0.16	-0.32	0.80
R^2				0.45	

Results from the unadjusted meta-regressions examining the associations between the four national level indicators and mismatch 1, in which a man stated that his ideal number of children was greater than his actual number of children but we wanted no more children, reveal statistically significant associations between the mismatch and HIV prevalence, infant mortality rate, labor force participation, and log GDP/capita. There are positive associations between mismatch 1 and HIV and log GDP/capita and negative associations between the mismatch and IMR and labor force participation.

When all four national level indicators are included in the fully adjusted model, HIV prevalence and IMR remain statistically significant and the associations are strengthened. The association between labor force participation and mismatch 1 remains marginally significant at the 0.1 level. There is a positive association between the mismatch and HIV prevalence, so that nations with a higher HIV prevalence also have higher levels of mismatch among men. Specifically, a one percent increase in HIV prevalence leads to a 0.56 percent increase in the prevalence

of mismatch 1. Meanwhile, IMR and labor force participation exhibit negative associations such that nations with higher IMR and higher labor force participation have lower levels of mismatch.

In meta-regression analysis, the adjusted R^2 is the amount of between-country variation explained by the model. In the unadjusted models, the amount of variation explained ranges from 10 percent (labor force participation) to 17 percent (IMR). The fully adjusted model explains 45 percent of the between-country variation.

Mismatch 2: Ideal < Actual but Wants Another Child

Table 3 presents the results of the meta-regression analysis for mismatch 2.

Table 3. Associations Between National Level Indicators and Mismatch 2 (Ideal < Actual but Wants Another Child) Among Men: Results from Meta-regression Analysis

	Mismatch 2 (N=38)				
	Unadjusted			Adjusted	
	β	p	R^2	β	p
HIV	0.03	0.67	-0.25	-0.04	0.57
IMR	0.03	0.05	0.10	0.04	0.04
Labor Force	0.06	0.03	0.13	0.09	0.02
Log GDP/Capita	-0.45	0.26	0.19	0.94	0.13
R^2				0.18	

Mismatch 2, in which a man's actual number of children exceeds his stated ideal number of children but he wants another child, is significantly associated with the infant mortality rate and labor force participation in the unadjusted models. HIV prevalence, log GDP/capita, and TFR are not significantly associated with mismatch 2 in the unadjusted models.

When all four national level indicators are included in the full, adjusted model, IMR and labor force participation remain statistically significantly associated with mismatch 2 and the association is strengthened but still remains quite weak. A one percent increase in IMR and labor force participation results in a 0.04 percent and 0.09 percent increase in mismatch 2, respectively. HIV prevalence and log GDP/capita are not statistically significant and both see the direction of the non-significant association flip. The inclusion of IMR flips the direction of the HIV prevalence association while the inclusion of labor force participation is what reverses the direction of the log GDP/capita association, suggesting an interaction between these sets of variables. These interactions were tested and neither set were statistically significant in the model with mismatch 2.

In the unadjusted models, the adjusted R^2 ranges from a low of -0.25 (HIV prevalence) to a high of 0.19 (log GDP/capita) while the fully adjusted model explains 18 percent of the between-country variance.

Discussion and Conclusions

The infant mortality rate is the single national-level factor significantly associated with both mismatch 1 and mismatch 2 in the expected directions. An increase in the IMR is associated with a decrease in mismatch 1, in which a man has not yet achieved his ideal family size but we wants no more children, and with an increase in mismatch 2, in which a man has already reached, or exceeded, his ideal family size and yet still wants another child. This is consistent with past research examining the relationship between the infant mortality rate and fertility and has found that high infant mortality is associated with high fertility and that declines in the IMR of a country are associated with declines in fertility. Thus, high infant mortality may mean that a

mean is more likely to continue to want to childbearing, lowering the levels of mismatch 1 while increasing the levels of mismatch 2.

Labor force participation operates in the expected directions with both mismatch 1 and mismatch 2, although the association with mismatch 1 was only marginally statistically significant. As labor force participation increased, mismatch 1 decreased while mismatch 2 increased. With increasing labor force participation, men have increasingly reasonable and confident expectations that they will be able to find work, or remain employed, and be able to support their family. Thus, with this expectation, they may be more likely to continue childbearing, lowering levels of mismatch 1 and increasing levels of mismatch 2. In the case of mismatch 2, it may be that the ability, or expected ability, to afford another child supersedes an "ideal" about the number of children he would like to have.

HIV prevalence is associated with mismatch 1 but not with mismatch 2. As the prevalence of HIV infection increases, so does the prevalence of mismatch 1, that is men who state that they want no more children despite not achieving their ideal family size. This result is consistent with the literature that has found that HIV infection is associated with reduced fertility desires among HIV-infected men, for fear of being unable to care for their children or for fear of passing on the infection to their children. High rates of HIV infection in the context where a man in considering his future childbearing, whether or not he himself is HIV positive, may be influential enough to affect his fertility intentions, though the results of this study do not suggest causality.

Log GDP/capita is not significantly associated with either mismatch 1 or mismatch 2 in the adjusted models. It is, however, associated with mismatch 1 in the bivariate model in the expected direction - its non-significance in the fully adjusted model suggests an interaction with one or more of the other variables, such as labor force participation, where there is a significant amount of correlation between the two indicators (r=0.49). The insignificance of the relationships between GDP/capita and the two types of mismatch may be because GDP/capita is such an aggregate and high-level measure of the state of a nation's economy that it may be less individually relevant and thus have minimal influence on childbearing preferences and intentions.

As hypothesized, the four national level indicators of development, taken together, explain more of mismatch 1 than of mismatch 2. The four indicators explain nearly half of mismatch 1, while they explain less than 20 percent of mismatch 2. This suggests that these contextual factors in which these men are forming fertility preferences and making childbearing decisions, are more influential in decisions to cease childbearing rather than to continue childbearing. This is also suggestive of perhaps a greater degree of measurement error resulting in internally inconsistent responses like those that characterize mismatch 2. There is also shared variance among the four indicators, evidenced by the reduction in explanatory power from the unadjusted models to the adjusted models for both types of mismatch, suggesting that multiple dimensions of contextual influences matter for men.

There are several limitations to this analysis. First, this is a cross-sectional analysis and thus causality cannot be inferred from the results. The mismatch classification also comes from cross-sectional fertility preferences data -- previous literature has

shown that, while fertility preferences are largely stable, in certain age groups and under certain conditions fertility preferences are unstable and change over short periods of time (Sennott & Yeatman 2012; Roy et al 2008; Bankole & Westoff 1998). Secondly, this is an ecological analysis using aggregate estimates and national-level indicators and thus individual-level inferences cannot be made. Further, this analysis does not capture local variations in context and in the estimates. Lastly, the group of countries included in this analysis represents a select portion of the income spectrum and these results cannot be generalized to higher income countries.

Despite these limitations, several strengths are worth noting. First, the included countries do represent a wide variation in the total fertility rate as well as in modern contraceptive use, giving credence to the generalizability of these results among low- and middle-income countries. Second, while there is an extensive body of literature looking at fertility preferences, there exists a paucity of research looking at the consistency of responses, and those factors that may explain any found inconsistencies, to a widely accepted set of fertility preferences questions in arguably public health's most ubiquitous survey used to collect health information from low- and middle-income countries. Finally, the focus of this analysis is on men. Men are under-researched in the fertility literature, often only included as partners of their wives. By researching men as individual agents of reproductive behaviors we gain a more complete understanding of fertility and fertility preferences.

The prevalence of internally inconsistent responses among men and the results of these analyses exploring the factors associated with the mismatched responses suggest that the context in which men are forming and executing their fertility preferences and

intentions is important, especially in the decision to cease childbearing despite not having achieved a stated ideal family size; of particular importance are the infant mortality rate and the labor force participation of a nation. Further work, particularly a qualitative exploration, is needed to understand how men view and internalize the context in which they live in relation to their fertility preferences. However, the four national-level indicators of development that are the focus of the study leave the majority of the both types of mismatch unexplained. Thus, further research should explore the individual-level factors that are associated with and may further explain internally inconsistent responses to fertility preferences questions. Some of the national level indicators explored in this analysis may be operationalized at the individual level. For example, labor force participation at the individual level may operate as employment status, or whether or what kind of work the individual is engaged in. Labor force participation at the national level may indicate the ease of obtaining of job and securing income and so at the individual level wealth or expectations of wealth may be important. HIV prevalence at the national level may be part of questions at the micro level intending to capture or measure the health of an individual. The inclusion of these indicators in the type of analysis used here as well as analysis at the individual level will help to shed light on which factors are influencing fertility preferences and at which level of influence, macro, micro, or both, they matter for men.

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CHAPTER 4: "As long as he is bent on having more children, he will go for another woman": UNDERSTANDING THE INFLUENCES OF FERTILITY PREFERENCES AMONG MEN IN GHANA

Background

The concept of fertility preferences is often discussed and measured in different ways but throughout the fertility literature there has been some convergence towards a meaning that captures preferred or ideal family size. This is somewhat distinct from, but interrelated to, fertility intentions, or the desire to have a child or another child in some specified time frame. As Bongaarts points out as early as 1990, just because there is no single definition and fertility preferences are measured in different ways, does not make the concept or the measure invalid – it just means that we have to understand what it is we are measuring (Bongaarts 1990). In the quest to understand what is being measured when researchers try to quantify fertility preferences, understanding the drivers behind or the motivations for these responses is essential.

Only a handful of studies have explored the relationships between sociodemographic characteristics and fertility preferences, and fewer still have done so exclusively among men. Of those that do, quantitative approaches have found that education, type of union, and interspousal communication are some of the characteristics related to family size preferences (Isiugo-Abanihe, 1994). However, these quantitative approaches do not address or consider contextual influences on fertility preferences and fail to explore the mechanisms underlying or driving these associations. Qualitative approaches have found that education, wealth, and religion are important factors to consider when exploring fertility preferences (Hollos & Larsen, 2004) but largely these studies have been narrow in their objectives. The dynamism and

multifaceted nature of fertility preferences lends itself well to a mixed methods exploration to understand the complexity of preferences.

Mixed methods research synthesizes ideas from both qualitative and quantitative research. While there are many ways to do this, a common approach is to use both methodologies in conjunction to answer a research question by triangulating methods and data to provide a more complete understanding of a concept or phenomenon (Johnson et al, 2007). As Creswell and Clark layout, there are several types of sequential mixed methods designs, including an exploratory design in which qualitative data is collected and analyzed, building to a quantitative data analysis, and ending in an interpretation of results (Creswell & Clark, 2007).

In understanding fertility preferences, a qualitative exploration among men in Ghana will be able to capture and provide a more nuanced understanding of the motivations and influences behind the formation of and realization of fertility preferences. The qualitative approach will reflect both context and experience as well as produce findings that are not determined in advance or solely by a researcher. The results of the qualitative data collection will then be used to inform a quantitative analysis. The quantitative component of the mixed methods investigation will help to provide statistical evidence regarding fertility preferences among men in Ghana.

Ghana

Ghana, an English-speaking nation situated in Western Africa, has just over 26 million inhabitants amongst 10 administrative regions, with nearly half of the population living in urban areas (Ghana Statistical Service 2009; PRB 2013). Despite being the second most populous nation in West Africa, Ghana has the second lowest

total fertility rate (TFR) at 4.2 births per woman (GDHS 2014). Polygny is common in Ghana, particularly in the northern administrative regions (Northern, Upper East, Upper West) where the majority of the population is Muslim; in Ghana as a whole, nearly 10% of currently married men report being in polygynous unions (GDHS 2008). Married men in Ghana report slightly higher ideal family sizes than married women do: 5.1 children for men and 4.6 for women (GDHS 2008). Importantly, while differences exist among men and women, when compared to the country-level TFR of 4.2, it becomes evident that, on average, a mismatch exists between stated preferences and achieved fertility. As early as Becker (1976), researchers have argued that couples consider that tradeoff between quantity and quality based on the economic environments of both society and the individual when making fertility decisions, and Ghana is no exception (Teye 2012). As Yeatman et al (2013) point out, mismatches are to be expected when preferences are somewhat fluid and reflect context and experience.

Much of the previous fertility preferences and desires research in Ghana has focused on dyad- level conflict, that is the conflict that arises when preferences and/or desires differ between partners, and the power dynamics that influence the resolution of these conflicts (Ezeh 1993; DeRose et al 2002; Dodoo 1995; Ezeh, Seroussi, and Raggers 1996; Oheneba-Sakyi et al. 1995). Several of these studies have found that in Ghana men generally want more children than women, but that this does not necessarily lead to dyad-level conflict in a country where it is not uncommon for men to father children with more than one woman, whether through divorce and remarriage, polygny, or otherwise (DeRose et al 2002; Dodoo 1995; Ezeh, Seroussi, and Raggers 1996; Oheneba-Sakyi et al. 1995).

Some of the more recent fertility preferences literature to come out of Ghana has focused on the lasting impact of the Community Health and Family Planning Project of the Navrongo Health Research Center in northern Ghana. A quasi-experimental study, the main hypothesis of the project to be tested was whether access to convenient family planning service delivery could induce reproductive change. Phillips et al (2012) find evidence for a sustained change in fertility preferences (over time a lowering of preferences) as a result of exposure to the program but little evidence to suggest that this has resulted in sustained change in reproductive behavior (Phillips et al 2012). This then provides additional evidence that in Ghana a mismatch between preferences, whether stable or changing, and reproductive outcomes exist.

Objectives

The objectives of this study are to 1) explore, through focus groups, how men in Ghana think about fertility preferences and 2) using the qualitative data to inform a quantitative model, identify and test factors associated with inconsistent responses to fertility preferences questions.

Data and Methods

Qualitative

Limited literature exists studying men's fertility preferences and thus this gap in the literature lends itself well to qualitative data exploration and collection. Focus groups are a qualitative data collection method composed of several focus group members, led by a moderator, that allows for a fairly free interaction between participants (Morgan 1997). This guided but free interaction creates a dynamic and synergistic environment that elicits information about social norms and behaviors rather than

individual behaviors and circumstances (Mack et al 2005). Because fertility preferences are thought to be reflective of social and familial norms rather than individual behaviors and intentions, the use of focus groups is more appropriate than in-depth interviews. Further, focus groups work well as an exploratory research method where little research on a topic currently exists (Morgan 1997).

A field guide was developed and used by the discussion moderator to guide the discussion but was flexible enough to allow for free-flowing thoughts and ideas from the participants. The field guide presents culturally appropriate scenarios, or vignettes, with several follow-up questions meant to elicit information about societal and cultural norms regarding fertility preferences, the timing of the development of fertility preferences in a man's reproductive life, and the variation of these preferences over the reproductive lifespan. The three vignettes used in this study present three scenarios in which men may be thinking about their fertility preferences – either the formation of preferences or the stability or fluidity of their preferred family size over time.

- The man in the story is young and thinking about getting married and starting a family:
    - Kwame is 23 years old and is thinking about his future—his work, schooling and family. He has a girlfriend, Joanna, who he has been dating for two years. Kwame is considering whether they should marry.
- The man is a bit older, married and has children but not as many as he would prefer and is talking with his partner about having more children:

    - Kofi has been married for 5 years and has 2 children but he says that someday he would like to have a total of 6 children.
- The man is married with children but with fewer children that he would prefer and his wife wants no more children.
    - Daniel and Lydia have been married for 10 years. Before getting married, Daniel said he wanted 4 children, and Lydia agreed. After 10 years, they only have two children, a boy and a girl. Lydia thinks two children are enough. Daniel still wants 4 children.

Each vignette has accompanying questions that asks the men to describe what the man in the scenario may be thinking about, who he may be talking to for advice or opinions, or to provide advice to the man in the story. Vignettes are often used to facilitate discussions about topics that are not often discussed in everyday conversations (Ulin 2004) and help to encourage flow of discussion by allowing the participants to respond to the scenarios without having to divulge personal information or experiences if they do not want to.

The field guide was introduced during the local training of research assistants and was modified based on their input. The final field guide incorporated minor changes made during this training session as well as from feedback from the field after the first two focus group discussions (see Appendix for the full final focus group discussion field guide).

The focus group participants were recruited from the same four communities included in the quantitative survey (described below). Using the inclusion criteria that a

respondent must be male, between the ages of 18 and 59, and be in a married or cohabitating relationship, the sample was selected purposefully based on age and religion and the focus groups were stratified based on these characteristics. Using a list of enumerated households and the occupants in each household in the four selected communities, eligible men 18-34 and 35-59 were identified and randomly selected for recruitment. These men live in the same communities from which participants were selected for the quantitative survey but selection for the quantitative survey was not an inclusion criterion for the qualitative data collection. A total of eight focus groups were recruited with 6-8 participants per focus group for a total of 54 participants across the eight focus group discussions.

Table 1. Focus Group Composition

Focus Group	Age	Religion	N
1	18-34	Muslim	6
2	18-34	Christian	6
3	35-59	Muslim	6
4	35-59	Muslim	7
5	18-34	Christian	8
6	35-59	Christian	6
7	35-59	Muslim	8
8	18-34	Christian	7
TOTAL			54

Each discussion lasted, on average, for 45-60 minutes and was conducted in the local language of Twi. All discussions were audio-recorded with consent from every participant. Each recording was then transcribed and translated from Twi to English and the notes taken during the discussions supplemented the transcripts. A thematic analysis was used to identify and examine patterns, or themes, resulting from each discussion using Atlas.ti software.

As little prior research exists regarding fertility preferences among men, rather than taking a deductive approach and outlining an initial set of codes prior to coding, an inductive coding approach was used to let themes emerge directly from the data (Fereday & Muir-Cochrane 2006). In this way, the emergent themes are entirely data-driven and thus linked very closely with the collected data. There are several steps to an inductive coding approach. After an initial review and familiarization with the data, a list of codes was generated and a codebook developed to keep track of the codes and to ensure consistent application of the codes throughout the eight focus group discussion transcripts. An appropriate code is one that captures the richness of the phenomenon (Boyatzis 1998; Fereday & Muir-Cochrane 2006). These codes were then used to create a list of concepts that grouped together data of similar content. From there, these concepts were defined as the major themes emerging from the data. A 'good' theme is one that describes and organizes the data and, at best, interprets aspects of the coded phenomenon (Boyatzis 1998; Fereday & Muir-Cochrane 2006).

The qualitative data collection was approved by the Institutional Review Boards at both the Johns Hopkins University Bloomberg School of Public Health and the Kwame Nkrumah University of Science and Technology.

Quantitative

The Family Health and Wealth Study (FHWS) is a longitudinal, open-cohort study in six countries, Ghana, Malawi, Ethiopia, Uganda, and Nigeria. Using inclusion criteria based on age (15-44 for women and 18-59 for men), relationship status (married or cohabitating), and residency in the study area, FHWS enrolled married or cohabitating couples and administered a survey to both the man and the woman, with the surveys collecting largely identical information about fertility preferences, contraceptive use,

health status, and relationship quality. In Ghana, FHWS is implemented by the Kwame Nkrumah University of Science and Technology (KNUST) in collaboration with the Bill & Melinda Gates Institute for Population and Reproductive Health. Participants were recruited from four peri-urban communities near Kumasi, the nation's second largest city, in the Ashanti region of Ghana. Round 1 of data collection occurred in 2010 with 799 married or cohabitating couples enrolling. Respondents were matched with an interviewer of the same sex and the interview was conducted in the local language of Twi. The response rate for Round 1 was 96.7%.

The main dependent variable in the quantitative analysis is a mismatch in fertility preference responses. A mismatch in fertility preferences in the analyses that follow is defined in two ways: (1) a man who says his ideal number of children is greater than the number of children he currently has but he states that he wants no more children or (2) a man who says his ideal number of children is fewer than the number of children he currently has but he states that he wants another child.

Major themes identified from qualitative data were mapped onto existing variables in Round 1 of the FHWS dataset. These variables were then included as the focal predictors in the quantitative model exploring the associations of these variables with inconsistent fertility preferences responses, mismatch, in the data. The results of this mapping process are described in more detail below. Two of the emerging independent variables were created from scale items included in the survey. For both of these scales, commitment/love and communication, confirmatory factor analysis was used to test the relationship between the included scale items and the theoretical constructs of commitment/love and communication they intended to measure.

Complete detail regarding the confirmatory factor analysis procedure and results are included in the Appendix.

Regression Analysis

Logistic regression models are used to explore the associations between the independent variables of interest emerging from the qualitative data and both preferences and mismatch. The standard errors of both the bivariate and multivariate regressions are adjusted for clustering at the community level using the cluster option in Stata. Bivariate regressions were used to examine the individual association of each of the variables of interest as well as the main demographic characteristics included in the model, age, education, and religion, with the two main outcomes, preferences and mismatch. Three multivariate regression models were fit to explore the associations of mismatch with the variables of interest. Model I explores the associations of the economic category of variables with mismatch, Model II adds the relationship quality variables, and Model III is the fully adjusted model with all variables of interest included in the model. All analyses were conducted using Stata 14.0.

The major emerging themes resulting from the qualitative data analysis are presented first, followed by the quantitative results with mismatch 1 (ideal < actual but wants no more children) as the dependent variable and then with mismatch 2 (ideal > actual but wants another child) as the main outcome. The discussion section then synthesizes the results from both the qualitative and quantitative analyses.

Qualitative Results

The qualitative data analysis identified five major themes motivating fertility preferences and a mismatch in fertility preferences and actual fertility: economics, relationship quality, religion, health concerns, and multiple wives or partners.

Economics

Men in each focus group stressed that the most important factor to consider when thinking about how many children a man would like to have is economic capacity. Throughout the eight focus group discussions, economic capacity took several forms: finances, employment, and housing. Finances included discussions about having a sufficient amount of money to be able to properly care for any and all children that a man bears.

"…everybody wishes to put things together in a proper way before he will decide to have children or not…maybe he [Kofi] has no education or is not working or has no capital to cater for himself or even the children, so at that age, if he intends to deliver, it may happen to he will not be able to cater for the children and at the end the children will become a burden in the society" (Christian, age 36, 2 children)

M: "Are there community pressures to have a certain number of children?"

R: "It depends on the financial status to be able to bring up the children, not the community or society that determines the number of children." (Christian, age 58, 7 children)

"I think all the couple should consider is whether or not there is the finance to sponsor the children's education and if they think they can sponsor the children, then they should give birth to have many children as they can have." (Muslim, age 32, 4 children)

What constituted the proper care of children varied between focus groups, but often included being able to send their children to school.

"Some people give birth and are unable to take care of them. For instance, their children may not be going to school. That is a problem." (Muslim, age 43, 5 children)

Employment was also important to the men, particularly men of a young age. During many of the discussions, the men were clear that in the scenario involving a young man, the man first needed to finish their schooling and secure employment before considering marrying and having children. Employment was also an important factor tied into finances and being able to care for any children.

"Maybe the kind of work he is doing is good for him and he gets more income. He can decide to give birth to 6 children when his job is good. He wouldn't be thinking of 6 children if his income is low." (Muslim, age 58, 3 children)

Housing, while mentioned less often than finances and employment, played a vital role in the consideration of number of children for these men. Having a reasonably priced house that could accommodate the family, whatever the size, was a necessary component.

"As said by my colleagues, it may happen that Kofi has an ambition that in 10 years he may have finished building his house and therefore would be able to take care of the children." (Christian, age 45, 7 children)

Religion

Religious beliefs were cited as an important factor when considering the number of children a man wants to have, although religious beliefs were more often cited by the Muslim focus groups than the Christian focus groups. Most often, the men brought up religion in the context of children as gifts from god. Therefore, men had no role in deciding the number of children a family should have – this was up to god and the number of children would be seen as blessings delivered to the family.

"In Islam, we don't sit and plan the number of children we would like to have. We believe that whatever God gives us is fine."(Muslim, age 30, 1 child)

Interestingly, in two of the focus groups, when the discussion turned to religion and children as blessings from god, some of the men added an important caveat to this belief: that financial strength is also important and may supersede the notion that the number of children is up to god.

"According to our customs as Muslims, we don't think about the number of children we want to have when we marry. Children are gifts from God. But what can influence one's decision to have children is financial strength. When one is financially sound, then one can decide to have more children." (Muslim, 34, 3 children)

Relationship Quality

When thinking about the number of children to have, or more often in decisions regarding whether to have a child or have another child, the men in the focus group discussions often brought up the idea of love and relationship quality. They noted that it was important to be in a marriage in which both spouses loved each other and the quality of the relationship is high in order to consider bringing children into the family. Fighting, love lost, and general poor relationship quality may make men decide against having a child or having another child, even if their stated ideal family size has not yet been achieved.

"The relationship between the two of them can bring a change of mind [in the number of children to have]. If the love between them is gone so cold, nothing will trigger them to continue having children." (Muslim, age 58, 3 children)

Love for a man's partner was also cited as a reason that Kofi may agree to have fewer children that he would prefer if his partner wants fewer.

"Maybe the guy may change his mind based on the love he has for his wife." (Muslim, age 28, 2 children)

Communication with one's partner also played a role in the formation of fertility preferences. When presented with a scenario in which the couple was not married but thinking about getting married and having children, the moderator asked the men to whom Kofi would talk to when thinking about the number of children he would have. A common response was that Kofi would discuss this with his partner.

"I also think the right person to talk to him about children is his partner because at the end of the day, it is the two who will cater for them." (Muslim, age 34, 3 children)

Health Concerns

In several focus group discussions, men talked about health concerns as a barrier to having more children. These health concerns varied but primarily focused on either declines in health as the men and their partners aged and health concerns of their partner that may have left them infertile or that would make another pregnancy dangerous. When discussing declines in health during the aging process, some of the men brought up the fear that if they had children at too old of an age, they would not be healthy enough or live long enough to be able to properly financially support them. This would prevent them from having another child, even if the size of their family was smaller than their stated ideal or preferred family size.

"…now that he [Kofi] is growing older, his strength will come down and he may not be able to work as much as he used to. Why then should he add more children? Because if you can't work that hard to earn, keeping the home becomes difficult. So Kofi can definitely change his mind as time goes on so he can really take good care of his children." (Muslim, age 43, 5 children)

When discussions of their partner's health came up, all were very clear that they would decide not to have another child with their partner if it would put her life at risk.

"…my wife's delivery was through a surgical operation. The second an operation, the third an operation. I should know that if I do not stop getting her pregnant, it may not end well. So in such cases, the man can have a change of mind." (Muslim, age 50, 4 children)

Multiple Wives/Multiple Partners

When considering how to meet a man's stated preferred family size, there was division regarding whether a man would or should find a girlfriend or another wife if they find themselves in a situation where their partner does not or no longer agrees with him regarding how many children to have. There was little consensus around this issue across the eight focus group discussions. For some men, they suggested that the appropriate next step would be to find a girlfriend so that she could give him the remaining number of children he wanted.

"Oh yes, if there is no understanding between them [husband and wife], then as long as he is bent on having more children, he will go for another woman to give birth with. If it were to be me, that is what I would do! And if she agrees to take care of my extra two children with another woman, then that is fine, I will allow her to raise them. If she will not, that is also fine. The second woman will raise her own 2 children, but I will provide for them all."
(Christian, age 34, 3 children)

For many of the Muslim men, they brought up the custom in their religion, which permits them to marry more than one wife, and suggested that marrying a second woman and having children with her would be the solution.

"…in the Muslim community every man is entitled to four wives so if your first wife is not prepared to have more children, he can marry to avoid those arguments."
(Muslim, age 40, 0 children)

Yet for others, it was not advisable to seek out a second relationship even though fertility preferences were not met. For some this was out of love and devotion to the man's wife and for others it was out of convenience; or, more precisely, the

inconveniences, both emotional and financial, of having a girlfriend outside of the marriage or having a second family.

"Daniel will now have a lot of headache [if he takes a second wife] because having two wives isn't easy. It's a lot of burden he has brought upon himself. (Muslim, age 35, 4 children)

Lastly, for those men who advised having children with another woman if their fertility preferences were not met, additional children beyond their preferred family size were generally regarded in a positive way.

"I will congratulate the man for a job well done. He wanted to have two extra children and he has three instead of the two children so he has a bonus of one." (Muslim, age 22, 1 child)

However, many men suggested that exceeding one's fertility preference was only a blessing if he was financially capable of caring for more children.

"The expected four is now five. Honestly speaking, one marriage is not easy. Now he has another wife plus extra children. This comes with a lot of additional financial responsibilities. It may even affect the children if he doesn't get his finances right. That may be trouble for him." (Muslim, age 43, 5 children)

These five identified themes motivating fertility preference responses were then mapped onto the FHWS survey in Ghana in order to operationalize these concepts quantitatively and empirical test their relationships and associations with both types of mismatch.

Quantitative Results

Table 2 shows the characteristics of the 799 male respondents in Ghana. The mean age of the respondents is just under 41 years old and the majority as either Muslim or other Christian (Protestant, for example). Only a small proportion of the men have never received any formal education, and the majority of men have gone through at least secondary school. There is a large range for the number of children the men

have (0-13) but the mean number of children is just over 3, which is just slightly lower than the TFR of 3.6 in the Ashanti Region in the 2008 Ghana DHS (GDHS). Just below eight percent of the sample report having more than one wife.

Table 2. Demographic Characteristics of the FHWS Men Sample in Ghana (N=799)

	Mean or %	Range
Age	40.8	22-59
Religion (%)		
Catholic	8.4	
Anglican	1.4	
Methodist	4.6	
Presbyterian	3.5	
Other Christian	30.7	
Muslim	47.7	
Traditional/Spiritualist	0.3	
No religion	1.3	
Other	2.3	
Education (%)		
No formal	7.4	
Primary School	31.7	
Secondary school	53.6	
Tertiary education	7.3	
Number of Children	3.2	0-13
Number of Wives (%)		
One	92.2	
More than one	7.8	

Following the qualitative data analysis, the five major identified themes, economics, religion, relationship quality, health concerns, and multiple wives/partners, were then mapped onto the quantitative data to identify quantitative variables in the FHWS survey that could capture dimensions of each of these themes and would be important to include in quantitative model with mismatch as the outcome. See table A3 in the Appendix for the results of this mapping process. The economics theme mapped onto three quantitative variables: wealth expectations, current wealth, and employment status. Current wealth was constructed from a list of assets in the household. Religion, multiple wives and health concerns were mapped onto a single question about either the man's religion, whether he has more than one wife or his self-rated health, respectively. Relationship quality mapped onto four variables, including two

scales: commitment/love scale, communication scale, self-rated happiness in the current relationship, and whether the man reporting discussing number of children with his partner. For the two scales, commitment/love and communication, confirmatory factor analysis revealed that both scales were valid and reliable among this population of males in Ghana, with the exception of one item in each scale. The item in each scale was subsequently dropped and the scale respecified and tested. It is these respecified scales that are used to create the commitment/love and communication variables as a summation of responses to each item in the scale. Further detail can be found in the Appendix.

Table 3 shows the characteristics of the main independent and dependent variables in the FHWS sample of men. The prevalence in the sample of mismatch 1 is just under 11 percent while mismatch 2 is much less common with just over 1 percent of men in the sample saying that they want another child despite already having more children than they say is their preferred family size. On average, the men have high expectations for their future wealth but have a much lower average of current wealth.

Table 3. Main Dependent and Independent Variables (N=799)		
	Mean or %	Range
Wealth Expectations	4.5	1-5
Employment (%)		
Unemployed	43.8	
Employed_Irregular	47.1	
Employed_Salaried	9.2	
Current Wealth	3.0	1-5
Health Status (%)		
Average or below	13.5	
Good	40.9	
Very good	45.6	
Commitment/Love	33.6	14-36
Communication	20.9	-18-27
Relationship Happiness	4.9	1-6
Discussed Children with Partner (%)		
No	61.0	
Yes	36.3	
Ideal Number of Children (Preferences)	4.7	1-20
Wants Another Child (%)		
No	51.4	
Yes	37.7	
Don't Know	10.9	
Mismatch 1 (%)		
No	89.2	
Yes	10.8	
Mismatch 2 (%)		
No	98.7	
Yes	1.3	

Mismatch 1: Actual < Ideal but Wants No More Children

Table 4 reports the associations of three categories of focal variables, finances, relationship quality, and individual characteristics, with mismatch 1 in which the number of children that men have is less than their stated preferred family size but they say they want no more children. In the unadjusted model, each variables association with mismatch is tested individually. In the subsequent three models (I, II, III), blocks of related variables are added until the fully adjusted multivariate model is tested in Model III. Model I tests the associations of the financial variables with mismatch 1, Model II tests the associations of the relationship quality variables, and Model III includes all variables.

Table 4. Associations with Mismatch 1 (Actual < Ideal but Wants No More Children) Among Men in Ghana (N=791)								
	Unadjusted		Model I		Model II		Model III	
	OR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Finances								
Wealth Expectations	**1.08+**	**(0.95,2.47)**	**1.52***	**(1.00,2.30)**	**1.59****	**(1.14,2.20)**	**1.63****	**(1.18,2.25)**
Employment								
Unemployed (Ref)								
Employed_Irregular work	0.98	(0.48,1.99)	1.02	(0.50,2.10)	0.92	(0.59,1.43)	0.82	(0.64,1.06)
Employed_Salaried work	1.34	(0.43,4.14)	1.34	(0.39,4.64)	1.39	(0.40,4.80)	1.10	(0.39,3.16)
Current Wealth	**1.07**	**(0.88,1.3)**	**1.03**	**(0.86,1.23)**	**1.06**	**(0.86,1.30)**	**1.09**	**(0.88,1.35)**
Relationship Quality								
Commitment/Love	0.98	(0.92,1.04)			**1.06*****	(1.02,1.11)	**1.05*****	(1.03,1.07)
Communication	**0.96****	**(0.93,0.99)**			**0.95*****	**(0.93,0.97)**	**0.96*****	**(0.93,0.98)**
Relationship Happiness	0.77	(0.56,1.06)			**0.71*****	(0.54,0.92)	**0.73*****	(0.58,0.90)
Discussed # of children								
No (Ref)								
Yes	**1.05**	**(0.98,1.12)**			**1.04**	**(0.94,1.14)**	**1.01**	**(0.94,1.10)**
Individual Characteristics								
Age	**1.04****	(1.01,1.08)					**1.04***	(1.00,1.08)
Religion	**0.91***	**(0.83,1.00)**					**0.90*****	**(0.84,0.97)**
Education								
No Formal (Ref)								
Primary School	**3.08****	(1.25,7.67)					**3.70*****	(1.97,6.94)
Secondary School	1.66	(0.32,8.70)					1.85	(0.46,7.36)
Tertiary Education	4.87	(0.87,27.27)					**5.20****	(1.48,18.29)
Number of wives								
1 (Ref)								
More than 1	**1.47**	**(0.67,3.23)**					**1.30**	**(0.74,2.26)**
Health status								
Average or below (Ref)								
Good	0.71	(0.39,1.30)					**0.61*****	(0.41,0.90)
Very Good	**0.59*****	(0.43,0.82)					**0.59*****	(0.46,0.77)
Significance level: +p≤0.1, *p≤0.05, **p≤0.01, ***p≤0.001								
Note: All models are adjusted for clustering at the community level								

In the unadjusted models, wealth expectations, age, and having attended primary school are all individually positively associated with mismatch while communication, religion, and rating one's health as very good are all individually negatively associated with mismatch.

In Model I, wealth expectations is positively associated with mismatch (Adjusted Odds Ratio (AOR) = 1.52, 95% Confidence Interval (95% CI): 1.0 – 2.30) while neither employment nor the measure of current wealth show a statistically significant association.

In Model II, adding in the relationship quality variables, commitment/love is positively associated with the mismatch (AOR = 1.06, 95% CI: 1.02-1.11) and communication and relationship happiness are negatively associated with the mismatch (AOR = 0.95, 95% CI: 0.93-0.97; AOR = 0.71, 95% CI: 0.54-0.92, respectively). As positive communication and happiness in the relationship both increase, the odds for a mismatch decrease while the opposite is true for increased commitment or love in the relationship.

Model III is the fully adjusted model with all financial, relationship quality, and individual characteristic variables included. In this model, wealth expectations remains positively associated with a mismatch (AOR = 1.63; 95% CI: 1.18-2.25). For each unit increase in wealth expectations, the mismatch between men report not wanting another child even though there stated preference is greater than the actual number of children they have increases by 1.63 times. In terms of the relationship quality variables, commitment/love is positively associated with a mismatch (AOR = 1.05, 95% CI: 1.03-1.07) while communication and happiness in the relationship are negatively associated with a mismatch (AOR = 0.96, 95% CI: 0.93-0.98; AOR = 0.73, 95% CI: 0.58, 0.90, respectively). Among the added individual characteristics, age and attending primary or tertiary school show a positive relationship with mismatch, low the confidence interval for having attended tertiary school is quite large due to the small number of men who report having done so (AOR = 1.04, (95% CI: 1.0-1.08; AOR = 3.70, 95% CI: 1.97-6.94; AOR = 5.20, 95% CI: 1.48-18.29). Religion and health status, both good and very good, are all negatively associated with this

mismatch (AOR = 0.90, 95% CI: 0.84-0.97); AOR = 0.60, 95% CI: 0.41-0.90; AOR = 0.59, 95% CI: 0.46-0.77, respectively).

Mismatch 2: Actual > Ideal but Wants Another Child

The relationships of the same set of variables with mismatch 2, in which the number of children a man has is in excess of his stated preferred family size but he reports wanting another child, were tested in the same way as mismatch 1. Table 5 reports the results of the unadjusted model, and Models I, II, and III. Mismatch associations with both number of wives and self-rated health status as 'very good' are omitted from the models. Number of wives nearly perfectly predicted the mismatch because nearly all mismatched men had more than one wife. Very good health status is omitted from the model due to the small sample size in this category of self-rated health among the men included in this model.

Table 5. Associations with Mismatch 2 (Actual > Ideal but Wants Another Child) Among Men in Ghana (N=685)

	Unadjusted		Model I		Model II		Model III	
	OR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Finances								
Wealth Expectations	**0.55****	**(0.34, 0.88)**	**0.60**	**(0.33, 1.07)**	**0.55****	**(0.32, 0.95)**	**0.50****	**(0.27, 0.94)**
Employment								
Unemployed (Ref)								
Employed_Irregular work	0.55	(0.09, 3.27)	0.46	(0.15, 1.40)	0.49	(0.16, 1.48)	**0.33*****	(0.19, 0.56)
Employed_Salaried work	1.94	(0.45, 8.36)	2.06	(0.55, 7.66)	1.99	(0.41, 9.74)	1.44	(0.65, 3.22)
Current Wealth	**0.73**	**(0.42, 1.28)**	**0.74**	**(0.38, 1.43)**	**0.74**	**(0.40, 1.34)**	**0.84**	**(0.48, 1.47)**
Relationship Quality								
Commitment/Love	**0.99****	(0.98, 0.99)			**0.94***	(0.88, 1.00)	0.96	(0.90, 1.02)
Communication	**1.03^{+}**	**(1.00, 1.05)**			**1.04***	**(1.00, 1.08)**	**1.04**	**(0.99, 1.09)**
Relationship Happiness	1.14	(0.87, 1.50)			**1.36*****	(1.07, 1.73)	**1.34****	(1.05, 1.70)
Discussed # of children								
No (Ref)								
Yes	**0.96**	**(0.52, 1.77)**			**0.96**	**(0.54, 1.70)**	**0.82**	**(0.44, 1.55)**
Individual Characteristics								
Age	1.06	(0.98, 1.15)					1.10	(0.98, 1.22)
Religion	**1.66*****	**(1.31, 2.10)**					**1.79*****	**(1.26, 2.54)**
Education								
No Formal (Ref)								
Primary School	0.93	(0.07, 11.78)					2.97	(0.57, 15.57)
Secondary School	0.55	(0.11, 2.61)					1.49	(0.51, 4.37)
Tertiary Education	1.02	(0.05, 20.53)					3.15	(0.33, 30.06)
Number of wives								
1 (Ref)								
More than 1	**Omitted**	**Omitted**					**Omitted**	**Omitted**
Health status								
Average or below (Ref)								
Good	1.12	(0.29, 4.33)					0.82	(0.18, 3.68)
Very Good	Omitted	Omitted					Omitted	Omitted

Significance level: +p≤0.1, *p≤0.05, **p≤0.01, ***p≤0.001

Note: All models are adjusted for clustering at the community level

In the unadjusted models, wealth expectations and commitment/love are negatively associated with mismatch 2. That is, men who perceive their wealth as improving in the future and who report a greater sense of commitment and love in their relationship are less likely to have this type of mismatch (Odds Ratio (OR) = 0.55, 95% CI: 0.34 – 0.88; OR = 0.99, 95% CI: 0.98 – 0.99, respectively). Communication and religion are both positively associated with mismatch 2. Men who report more positive, constructive communication in their relationship are slightly less likely to report wanting to exceed their fertility preferences (OR = 1.03, 95% CI: 1.00 – 1.05).

In Model I, none of the finance variables are statistically associated with mismatch.

In Model II, higher wealth expectations is again significantly associated with a lower odds of reporting wanting another child after having exceeding the preferred family size (AOR = 0.55, 95% CI: 0.32, 095). Commitment/love and communication are just barely significantly associated with mismatch while higher relationship happiness significantly increases the odds of this type of mismatch (AOR = 1.36, 95% CI: 1.07-1.73).

In Model III, the fully adjusted multivariate model included all variables, higher wealth expectations remains significantly associated with a lower odds of reporting wanting another child after having exceeding the preferred family size (AOR = 0.50, 95% CI: 0.27, 0.94). Being employed in a job that does not provide steady, salaried work lowers the odds of this type of mismatch over those men who report being unemployed (AOR = 0.33, 95% CI: 0.19, 0.56). The only relationship quality variable to remain significantly associated with wanting another child after having exceeding the preferred family size is relationship happiness – higher relationship happiness is associated with increased odds of 1.34 of a mismatch (AOR = 1.34, 95% CI: 1.05, 1.70). Religion also remains highly significantly associated with mismatch (AOR = 1.79, 95% CI: 1.26, 2.54).

Discussion and Conclusions

Findings from both the qualitative data as well as the quantitative analysis suggest that some of the most important considerations men have when thinking about their

fertility preferences, both in the formation of and in meeting their preferences, are economics, relationship quality, religion, health concerns, and multiple partners.

Economic considerations permeated each of the focus group discussions. Being able to care for one's children economically through accumulation of wealth, employment, and housing, and, importantly, to be able to send their children to school was a high priority for most men. During the focus group discussions, these considerations were both important in the formation of fertility preferences and in any change in fertility preferences that may occur in reaction to changing economic circumstances. Much was made during many of the discussions of Ghana's currently declining economy and it became evident that context matters, particularly when it comes to the stability or fluidity of preferences. For most men is the discussions, if the financial situation would not support another child, they would consider not having another child even if that meant not meeting their preferred family size. The quantitative findings tell a similar story.

Expectations of a man's future financial situation were positively associated with mismatch 1-- men who had higher expectations for a better financial situation in the future in a year, were more likely to report not wanting another child despite not achieving their preferred or ideal family size. Conversely, higher wealth expectations for the future decreased the odds that a man would want another child after already exceeding his preferred number of children. This is again consistent with the quality vs. quantity dichotomy and suggests that future wealth may used to invest in the children a man already has (mismatch 2). Further, this finding conforms to economic theory of the quality/quantity tradeoff (Becker 1971) – that as wealth increased,

parents would want to invest that wealth into increasing the quality of their existing children rather than increasing the overall quantity of children. A similar argument can be made for the negative relationship seen between irregular employment and mismatch 2 – that being employed, even irregularly, as compared to being unemployed reduces the odds of a mismatch. These irregularly employed men may be using the income generated by their employment to invest in the quality of their current children rather than using the income for another child beyond their already exceeded fertility preference.

Another important factor that came up in the focus group discussions was relationship quality. Multiple dimensions of relationship quality were mentioned, particularly love and communication with one's partner, and that poor relationship quality may be a reason that men don't fulfill their fertility preferences. This is an interesting finding as much of the previous literature around fertility preferences have not considered or factored in relationship quality and few studies have tested relationship quality's associations with dimensions of fertility preferences empirically.

Two of the four relationship quality variables exhibit a negative relationship with mismatch 1. That is, as positive, constructive communication increases and as feelings of happiness in one's relationship increases, the less likely there is to be a mismatch in which men report wanting to stop childbearing before reaching their preferred family size. This is consistent with findings in the qualitative data that suggest that poor relationship quality is a reason that a man might consider ceasing childbearing before meeting his preferences. And so, in stands to reason then that higher relationship quality allows men to have the number of children that they think

a family should have, thus lowering the odds for a mismatch. While few quantitative studies have looked specifically at the link between relationship quality and fertility, several studies have looked at marital or union stability and fertility and found that unions that are less stable tend to produce fewer children (Lillard & Waite 1993; Meyers 1997). Additionally, higher reported communication within a relationship may be indicative of discussions around fertility and thus men who say they want another child may foresee their ability to effectively communicate and negotiate with their partner to achieve their intended family size. Happiness in the relationship was the only significant relationship quality dimension in the mismatch 2 model and it works in the opposite direction as it does in the mismatch 1 model, which is to be expected given that these two types of mismatches are essentially each other's opposites.

A more paradoxical finding that is men who report higher levels of love or commitment in their relationship are more likely to also report that they wish to stop having children before reaching their fertility preferences. This, however, fits with a study from Rijken and Liefbroer (2009) who find that positive relationship quality has negative effects on fertility. To explain this, the researchers posit that those who report positive or high relationship quality may be concerned that an additional child would be disruptive to that and not having another child is a way to preserve the high quality of their relationship.

Religion played in role in how men thought about and talked about fertility preferences throughout the focus group discussions. Interestingly, it was mostly in the focus groups composed of Muslims were religious doctrine regarding children

was explicitly stated and considered, however in the Christian focus groups religion was oft mentioned throughout the discussions. The quantitative findings also suggest that religion is associated with mismatch 1. In this case, because of the many religions included in the response options that make up this variable, it is hard to interpret the odds ratio in this association but the statistical significance of the variable in both the unadjusted and fully adjusted models suggest its importance when considering fertility preferences and inconsistent responses. This fits with literature, which has found that religious differentials in fertility appear largely because of differentials in the acceptance and practice of contraception and in Ghana may also be due to variations in attitudes towards the value of children (Boadu 2002). Religion again plays an important role in the mismatch 2 model, suggesting that in both scenarios of mismatch, religion is vital to understanding the motivations behind each.

Another emergent theme during the focus group discussions rarely seen in the fertility preferences literature was health concerns. Many of the men expressed concerns regarding their ability to care for children as they aged and their health declined. An interesting facet of studying men's fertility is that, while women have fairly definitive reproductive lifespans, the reproductive lifespan of men is not so easily defined. The way in which the health concerns were spoken of during the discussions suggests some sort of self-imposed limit to one's own reproductive lifespan. If failing or declining health constrained the ability of a man to be able to properly care for another child, economically or otherwise, he may consider not having another child, despite having fewer children than would be his preferred family size.

Men who self-rated their health as good or very good as opposed to those who self-rated their health as average or below were less likely to be mismatched as wanting to stop childbearing before meeting their preferences. That is, men who reported their health to be good or very good were more likely to want another child when their fertility preferences had not yet been met. Again, this follows the quantitative findings in which men expressed that one reason that they may stop childbearing before their preferences were met would be due to health concerns. Thus, men who report better health are more likely to want another child when their fertility preferences have not yet been realized, lowering the odds for a mismatch. This quantitative finding supported by the qualitative data is of particular interest as health status is not a commonly included predictor of fertility in the traditional fertility literature. Both of these results highlight the need to consider including men's health in future studies around fertility and fertility preferences.

Having multiple wives or multiple partners as a way for a man to meet his fertility preference was the most divisive issue talked about during the focus group discussions. Previous literature on this same topic in Nigeria found that when men's fertility preferences exceeded their partner's, men were able to prospectively rectify this imbalance through polygyny (Mott & Mott 1985). During the focus group discussions, when asked whether or not it would be advisable to find a girlfriend or a second wife if one's own partner was unwilling to bear the number of children a man wanted, many of the men suggested that this was a viable alternative towards fulfilling fertility preferences. Some of the men responded that it would only be advisable if the finances could support another woman and more children. And yet other believed that trying to support a second family to meeting one's fertility

preferences is not acceptable. This conflicted finding may be one reason why having more than one wife or partner was not associated with mismatch 1 in the quantitative analysis.

Limitations

There are several important limitations that must be considered when interpreting these findings. First, the qualitative data collection occurred in 4 peri-urban communities outside of Kumasi in Ghana among men in cohabiting or married relationships and thus the results may not be generalizable to a broader population either within Ghana or outside of Ghana. Second, bias is of concern in the data analysis phase of the qualitative investigation. The general domains of questions in the quantitative FHWS survey were known before the qualitative coding process commenced and so it is possible that the themes generated during the coding process may have been biased by the a prior knowledge. Third, the quantitative data is cross-sectional and thus casual inferences between the focal variables of interest and mismatch cannot be inferred. Last, the men that were selected to participate in FHWS are all in cohabiting or married relationships. Thus, it is not a random sample of men but rather of married men and these men may be different from those men that are not in stable unions or not in unions at all.

Strengths

Despite these limitations, this study has several strengths. The study uses a mixed methods approach to understanding fertility preferences among men. Use of both qualitative and quantitative methods allows for a more holist approach to the investigation of fertility preferences. The qualitative approach provides a deeper and more meaningful exploration while the quantitative approach quantifies the strength of the association between fertility preferences and relationship quality and allows for

statistical testing of the measurement of fertility preference mismatches among men in Ghana. Another major strength of this study is that it fills in a large gap in the literature left by the lack of studies whose focus is solely on men. To date, no other study has examined the complexity of measuring fertility preferences among men. The qualitative study is the first of its kind, to our knowledge, to explore the meaning of fertility preferences among men and thus adds to our understanding of men's fertility. Additionally, the FHWS quantitative survey contains questions not often included in traditional or more ubiquitous surveys, allowing the mapping process from qualitative data to quantitative data to take place and enhance our understanding of factors related to inconsistent responses provided by men. Additionally, by acknowledging men as individuals in a partnership rather than just as a woman's partner, this study helps to provide a more complete understanding about fertility preferences.

The qualitative and quantitative data in this study largely converge to identify several important factors to consider when investigating men's fertility preferences and mismatches. Two of the emerging factors from the qualitative analysis that were also significant in the quantitative analysis, relationship quality and health concerns, are variables that have not often been included in empirical analyses of fertility preferences. The results of this mixed methods analysis suggest that including valid measures of relationship quality and a measure of health status, in addition to both dimensions of economics as well as religion, provide a more complete understanding of fertility preferences among men and what may be motivating or underlying inconsistent quantitative responses to fertility preferences questions. Because this is one of the few mixed methods studies of fertility preferences among men, additional

research is needed to add to the evidence as well as understand the contextual differences in these factors in other areas outside of Ghana. Still, these findings are an important contribution to the limited evidence base regarding men's fertility preferences and suggest that programs designed to address fertility or fertility preferences should understand and address the varied motivators of preferences among men.

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Appendix

A. Focus Group Discussion Field Guide

Thank you for agreeing to meet with us today. My name is [MODERATOR NAME] and I'll be leading the discussion today and this is [NOTETAKER NAME] and he will be taking notes throughout the discussion.

During this discussion, we will be talking about how men in your community think about how many children they want to have. There are no right or wrong answers and you do not have to answer any question that you feel uncomfortable answering. You may also leave the discussion at any time.

Everyone in the room has an important contribution and we ask that we are respectful of everyone's thoughts and comments, that everyone is given a chance to speak, and that we minimize interruptions of each other. You may not always agree with what someone says and that is ok, but please be polite and respectful.

Once you leave this room, it is important that you do not share what was discussed with anyone.

Vignette 1

Kwame is 23 years old and is thinking about his future—his work, schooling and family. He has a girlfriend, Joanna, who he has been dating for two years. Kwame is considering whether they should marry.

1. What are the main expectations that men like Kwame have for a marriage?
2. Do young men like Kwame think about having children? What might he be thinking at this age?
    - Who will talk to Kwame about children?

- Will his parents talk to him about children? Will his friends? Anyone else?

3. Will he and Joanna discuss how many children before they marry?
    - If they discuss it, and find they do not agree on the number of children, will they still marry? Why or why not?

Vignette 2

Kofi has been married for 5 years and has 2 children but he says that someday he would like to have a total of 6 children.

1. What influenced Kofi's decision to have 6 children?
    a. Probes
        i. Are there community pressures to have a certain number of children?
            1. If yes, where do these pressures come from?
        ii. Are there pressures from a man's family to have a certain number of children?
            1. If yes, where do these pressures come from?

2. Over time, what things might make Kofi change his mind about the total number of children he would like to have?

Vignette 3

Daniel and Lydia have been married for 10 years. Before getting married, Daniel said he wanted 4 children, and Lydia agreed. After 10 years, they only have two children, a boy and a girl. Lydia thinks two children are enough. Daniel still wants 4 children.

1. How big of a problem is the fact that they don't agree on the number of children?
    - Will they argue? Why or why not?
    - Will it break their marriage? Why or why not?
    - Will Daniel change his mind? Will Lydia? Why or why not?
    - Will Daniel find a girlfriend? Or a second wife? Why or why not?
2. Daniel has been talking to some of his friends about the problem. Imagine you are Daniel's friends. What will you advise him?
    - Imagine you are Daniel's family. What will you advise him?
3. Daniel takes a girlfriend and he has 3 children with her. How will Daniel feel when has 5 children but said he wanted 4?

B. Confirmatory Factor Analysis (CFA)

The scales included in the survey are the Commitment Subscale of the Triangular Love Scale (Commitment/love scale) and the Constructive Communication Subscale of the Communication Patterns Questionnaire (Communication Scale). The Commitment Scale is a subscale of the Sternberg Triangular Love Scale that seeks to measure intimacy, passion, and commitment and the Commitment Scale aims to measure a person's long-term commitment to their partner. The Communication Scale aims to capture the constructiveness of an individual's communication during

conflict with their partner by assessing individual's interpersonal communication patterns (Sternberg 1997; Christiansen 1996). The Commitment Scale contains five questions and asks the respondents to assess how true the statements are to them of a sale of 1 to 9, 1 being "not at all" and 9 being "extremely", for a possible scale range of 5-45. The Communication scale consists of seven questions and asks the respondents to say what they do when a problem arises in their relationship, on a scale of 1 to 10, 1 being "very unlikely" and 10 being "very likely". Of the seven questions that make up the Communication scale, three questions are about positive, constructive communication and the other four are framed as negative, destructive communication. Thus, to establish the range of the scale, the four negative, destructive communication question scores are summed and then subtracted from

the sum of the positive, constructive communication questions, resulting in a scale range of
-37-26.

Confirmatory Factor Analysis (CFA) is used to test whether the measures of a construct are consistent with an a priori understanding of the construct (Brown 2006). CFA tests the directional relationship between the scale items and the theoretical construct of either commitment/love or communication. An asymptotically distribution free estimation method retaining all observations was used to estimate measurement coefficients (factor loadings). Asymptotically distribution free estimation makes no normality assumptions about the items in the construct and is the most appropriate estimation technique when more than one item in the construct violates the assumption of normality (Acock 2013). In a large enough sample size, it

is largely equivalent to maximum likelihood estimation, the most common and efficient form of estimation. Following measurement coefficient estimation, goodness-of-fit tests (GOF) were performed with several GOF statistics examined and reported to assess model fit. These GOF statistics include the root mean squared error of approximation (RMSEA), the standardized root mean square residual (SRMR), the Tucker-Lewis Index (TLI) and the comparative fit index (CFI). The RMSEA considers how much error there is for each degree of freedom and penalizes the model for unnecessary complexity. The SRMR is similar and looks at discrepancies between the observed and predicted covariance matrix. The TLI assess whether the model being tested is an improved fit over the null model and penalizes a model for complexity. The CFI compares the model being tested to a baseline (null) model that assumes there is no relationship among any of the variables and examines the discrepancy between the data and the hypothesized model.

Following CFA conventions (Acock 2013), goodness-of-fit was established if:

- the RMSEA is less than or equal to 0.10
- the SRMR is less than or equal to 0.10
- the TLI is greater than or equal to 0.90
- the CFI is greater than or equal to 0.90

When the model did not pass these goodness-of-fit tests, modification indices were used to help guide any model adjustments that improved model fit.

Following model fit assessment, principle components factor analysis was used to confirm the number of factors that the items in the scale were loading on; an

eigenvalue of greater than 1 was used as a cutoff to determine the number of factors. Lastly, Cronbach's alpha was used to assess the internal consistency and reliability of the scale. Once the final scale was confirmed, every respondent received an individual score for each scale by summing all of the retained scale items.

Table A1. Results for Final CFA Model: Commitment/Love

	Unstadardized Loading	Standardized Loading
Q65: I expect my love for this partner to last for the rest of my life	1.00 (fixed)	0.94***
Q67: I view my relationship with my current partner as permanent	1.03***	0.93***
Q68: I am committed to maintaining my relationship with my current partner	0.86***	0.83***
Q69: I have confidence in the stability of my relationship with my current partner	0.99***	0.95***
Variances		
error.Q65	0.10	0.11
error.Q67	0.14	0.14
error.Q68	0.28	0.31
error.Q69	0.09	0.10
Commitment/Love	0.85	1.00 (fixed)

*** $p < 0.001$

Table A2. Results for Final CFA Model: Communication (Two Factor Model)

	Unstandardized Loadings	Standardized Loadings
Factor 1		
Q85: We try to discuss the problem	1.00 (fixed)	0.84***
Q86: We express their feelings to each other	1.37***	0.49***
Q87: We suggest possible solutions and compromises	1.21***	0.82***
Factor 2		
Q89: We threaten each other with negative consequences	1.00 (fixed)	0.97***
Q90: I call my partner names, swear at her, or attack her character	0.70***	0.81***
Q91: My partner calls me names, swears at me, or attacks my character	0.78***	0.74***
Variances		
Factor 1		
error.Q85	0.67	0.29
error.Q86	9.92	0.76
error.Q87	1.12	0.32
Constructive Communication	1.63	1.00 (fixed)
Factor 2		
error.Q89	0.05	0.05
error.Q90	0.23	0.34
error.Q91	0.46	0.45
Destructive Communication	0.92	1.00 (fixed)

*** $p < 0.001$

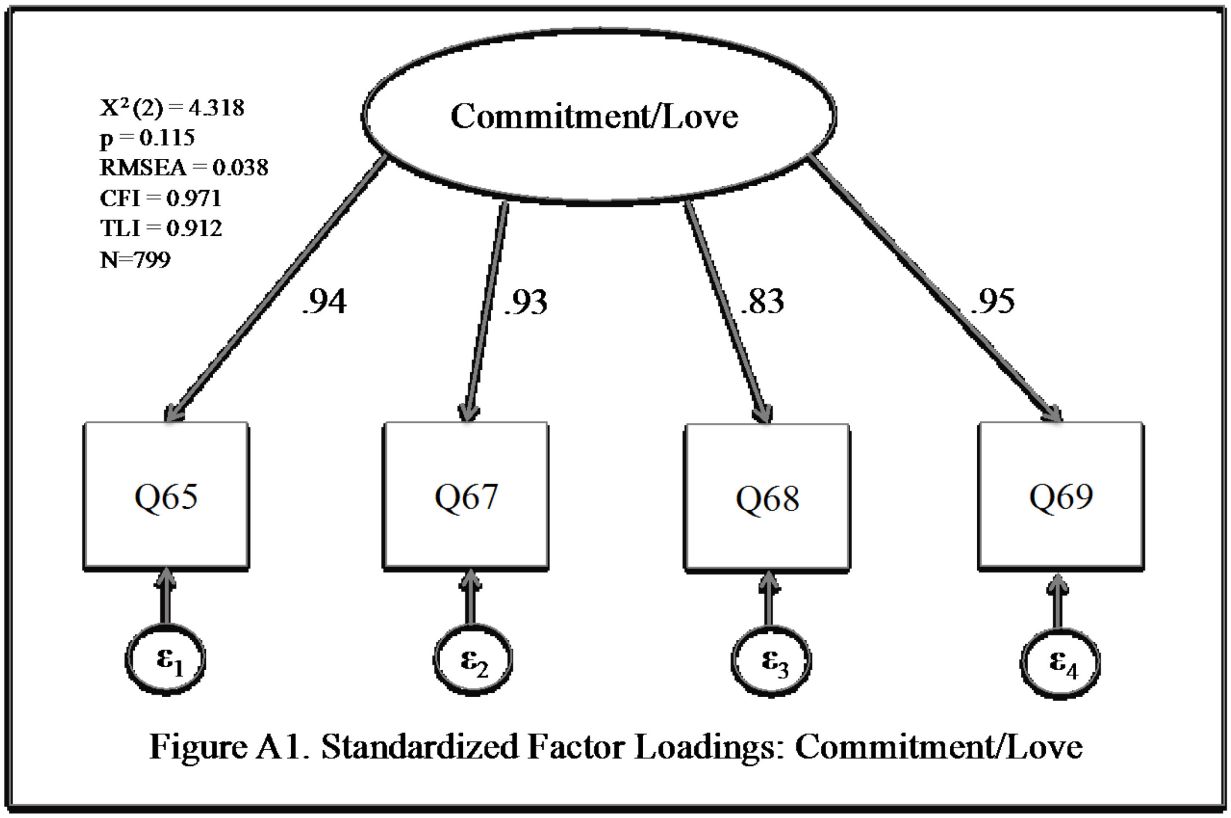

Figure A1. Standardized Factor Loadings: Commitment/Love

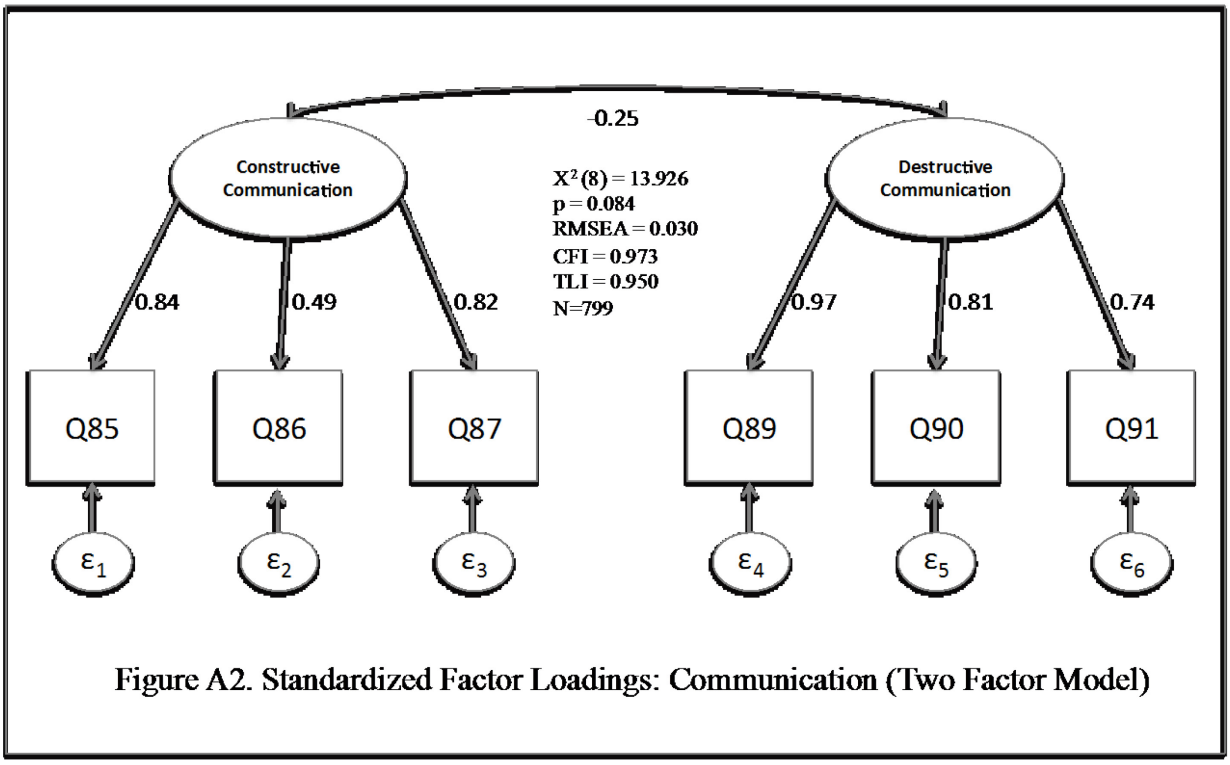

Figure A2. Standardized Factor Loadings: Communication (Two Factor Model)

C. Mapping Qualitative to Quantitative

Table A3. Mapping the Qualitative Themes to Quantiative Variables			
Qualitative Then	**Quantitative Variable**	**Question in FHWS Survey**	**Response Options**
Economics	Wealth Expectations	Do you think that one year from now your family will live better than today, or worse?	Will live much better…1 Will live somewhat better…2 Nothing will change…3 Will live somewhat worse…4 Will live much worse…5
	Current Wealth	I'd like to ask you about the furniture and appliances you have in your home. I will read a list of various items to you. Please tell me which of them your family owns and how many. In speaking of your family, include all who live with you and share your budget.	Yes/No: a) Bed b) Table c) Chair d) Dresser e) Refrigerator f) Separate Freezer g) Microwave h) Food Processor i) Washing Machine j) Vacuum Cleaner k) Cassette Player l) CD Player m) DVD Player n) TV (black and white) o) TV (color) p) VCR r) Tape recorder s) Stereo sound system t) Camera u) Video Camera v) Telephone (land line) w) Cell Phone x) Sewing Machine y) Personal Computer z) Motorcycle ii) Bicycle iii) Car/Truck iv) Horse/cart ivi) Motor Boat or Yacht ivii) Generator
	Employment	What is [Respondent's] occupation?	1=Agricultural worker (including animal care), own field 2=Agricultural wage-labor, for cash or in kind 3=Salaried employment 4=Petty trader /marketing 5=Daily laborer 6=Domestic activities 7=Student 8=Unemployed 9=Retired 10=Other 88=Don't know
Religion	Religion	What is your religion?	Catholic..1 Anglican…2 Methodist…3 Presbyterian…4 Other Christian…5 Muslim…6 Traditional/Spiritualist…7 No religion…8 Other…9
Health Concerns	Health	Tell me, please, how would you evaluate your health? Is it:	Very Good…1 Good…2 Average (not good, but not bad)…3 Bad…4 Very Bad…5
Multiple wives/partners	Number of Wives	Do you have more than one wife?	Yes…1 No…2 Respondent Doesn't Answer…99

Table A3. Mapping the Qualitative Themes to Quantiative Variables (continued)			
Relationship Quality	Commitment/Love Scale	I expect my love for my current partner to last for the rest of my life	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
		I can't imagine ending my relationship with my current partner	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
		I view my relationship with my current partner as permanent	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
		I am committed to maintaining my relationship with my current partner	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
		I have confidence in the stability of my relationship with my current partner	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
	Communication Scale	We try to discuss the problem	1 2 3 4 5 6 7 8 9 10 Very Unlikely Very Likely
		We express their feelings to each other	1 2 3 4 5 6 7 8 9 10 Very Unlikely Very Likely
		We suggest possible solutions and compromises	1 2 3 4 5 6 7 8 9 10 Very Unlikely Very Likely
		We blame, accuse and criticize each other	1 2 3 4 5 6 7 8 9 10 Very Unlikely Very Likely
		We threaten each other with negative consequences	1 2 3 4 5 6 7 8 9 10 Very Unlikely Very Likely
		I call my partner names, swear at her, or attack her character	1 2 3 4 5 6 7 8 9 10 Very Unlikely Very Likely
		My partner calls me names, swears at me, or attacks my character	1 2 3 4 5 6 7 8 9 10 Very Unlikely Very Likely
	Relationship Happiness	Please rate how happy you are in your relationship.	1 2 3 4 5 6 Unhappy Happy Perfectly happy
	Discuss Number of Children	Have you and your wife(ves) ever discussed the number of children you would like to have?	Yes...1 No...2 Don't Remember...88

D. Map of Ghana

Figure A3. Administrative Regions of Ghana
(Star denotes location of Kumasi)

CHAPTER 5: DISCUSSION AND CONCLUSIONS

The analyses in the preceding three chapters use a variety of data sources and take multiple analytic approaches to explore the meaning behind internally inconsistent responses among men to fertility preferences questions. Using nationally representative survey data, the thesis examined inconsistent responses to fertility preference questions among men. To date, this is the first to attempt to categorize or define the kinds of inconsistent responses. Defining inconsistent fertility preferences responses in two ways allows for a more illuminated investigation into these mismatches and helps to frame the mismatch in a way that allows for the various factors that may be of influence to act in different ways. Using both survey data and primary qualitative data collected in Ghana, the meaning and reasons for particular preferences, and the reasons behind inconsistent preferences is explored. The following section highlights the key findings from each of the analytic chapters.

Chapter 2 uses data from the Demographic and Health Survey in 38 countries to define and measure the prevalence of both types of mismatch based on inconsistent responses to survey questions. Mismatch 1 is defined as those men whose fertility preferences exceed their current family size but who report not wanting any more children while mismatch 2 is then defined as those men whose current family size exceeds their preferred family size but they report wanting another child. The findings reveal that mismatch 1, in which men want no more children even though their actual family size is smaller than their preferred family size, was more common in each of the 38 countries than was mismatch 2, in which men want another child despite having already exceeding their reported fertility preferences. Regional

variations existed in these estimates, with the lowest regional prevalence of mismatch 1 in sub-Saharan Africa (10.9%) as compared to a high of 23.5% in North Africa/West Asia/Europe, but finding that sub-Sharan Africa conversely has the highest regional prevalence of mismatch 2 at nearly 6 percent of men. The sub-Saharan African region has the highest preferred family size and the lowest regional mCPR and so a higher mismatch 2, in which men are exceeding their fertility preferences and want another child, is to be expected.

Chapter 3 uses the same data and mismatch classifications to explore factors at the macro, or national, level associated with each type of mismatch. In this way, the analysis seeks to shed light on what may be influencing the types of inconsistent responses found in Chapter 1. Infant mortality and labor force participation were both associated with both mismatch 1 and mismatch 2 in the hypothesized directions. The infant mortality rate was negatively associated with mismatch 1, that is, as infant mortality increased, the prevalence of men who do not want any more children before achieving their preferred family size decreases while IMR is positively associated with mismatch 2. As IMR increases, the prevalence of men wanting additional children despite having already exceeded their preferred family size increases. Similarly, labor force participation was negatively related to mismatch 1 but positively related to mismatch 2. Both of these factors worked one way with mismatch 1 and worked in the opposite direction in mismatch 2, which is to be expected given that the two types of mismatches are largely opposites of each other. Infant mortality has long been associated with fertility and this finding suggests that it continues to influence men's fertility preferences and inconsistent responses. Labor force participation is a measure of the ease or ability in securing employment.

Further, labor force participation and the ability men have to secure jobs in the current economy may also be related the wealth expectations. Lastly, an increase in HIV prevalence was associated with an increase in mismatch 1 - higher prevalence of HIV increases the number of men who report wanting to stop childbearing prior to meeting their fertility preferences. This is consistent with literature that HIV and fertility are negatively associated.

Chapter 4 explores the meaning of fertility preferences among men in Ghana, a nation that has one of the region's lowest fertility rates but also low levels of modern contraceptive use. The qualitative analysis finds several important themes that influence fertility preferences: economics, relationship quality, health concerns, religion, and multiple wives or partners. These factors were then operationalized quantitatively to test their relationship with both types of mismatches empirically. Expectations of future wealth, multiple dimensions of relationship quality, religion, and health status were associated with both mismatch 1 and to some extent mismatch 2. These findings help to add to the evidence base that these factors are both qualitatively and quantitatively important to consider and understand. Relationship quality and health status were both novel findings not previously considered in the literature and studies about fertility preferences. These findings suggest that future research around fertility preferences among men should include measures of both to investigate their relationship with fertility preferences and mismatch in other settings and contexts.

The findings of these three investigations demonstrate that inconsistent responses among men to the standard fertility preferences questions are prevalent, although this

prevalence varies widely based on country and region. As Bongaarts pointed out more than 20 years ago, this does not mean that our measures are invalid or that we should disregard the information that these questions provide (Bongaarts 1990). However, these findings do caution that these inconsistent responses exist and warrant an exploration as to factors that are influencing or might be motivating these responses. To best understand motivations, it is essential that context-specific investigation be undertaken, ideally using both qualitative and quantitative data for depth in understanding.

Van Peer (2002) argued that when studying fertility it is important think about ideal family size, desired family size, and achieved family size, noting that these three measure were related yet distinct and were likely not all equal to each other. That's to say that men, and women, can and do not always achieve nor want to achieve their preferred family size. In setting out his theory, Van Peer argues for an ordering of these concepts such that ideal family size is greater than desired family size which in turn is greater than achieved family size; thus, realized fertility results in fewer than the ideal number of children. The analyses in the preceding chapters expand upon and add to Van Peer's theory, finding that these dimensions of fertility do not necessarily take a single, ordered form; there are men who do not achieve their preferred family size but may want, and may try to correct this imbalance through polygyny, men who do not achieve their preferred family size and do not want to do so, and men who exceed their preferred family size. Thus it is important to not always assume that men fall short of their preferred family size and that when they do there are important underlying motivations for why that may occur or how men try and achieve their fertility preferences in other ways.

Public Health Implications

Qualitative and quantitative explorations in Ghana reveal that economic concerns are a primary influence and mechanism to changes in fertility preferences. Men expressed desire to properly care for and school their children and so future efforts should take these into consideration as an approach to family planning programs and campaigns to reduce unwanted fertility. Focusing on the economics of caring for children is not novel approach in family planning programming but much of these programmatic efforts have been aimed at women. These considerations are important to men and so this approach also needs to be aimed at men who, this thesis discovers, do carefully consider their ability to economically provide for the children that they have.

A lot of the data that exists on men's reproductive health and fertility has been collected during data collection among women and come from women's reports about men's behaviors, attitudes, and outcomes. While this has value and it is often important to know and undersand how women perceive the attitudes and behaviors of their partner, accurate reporting depends on full knowledge and communication between the partners. Thus, this data may not be a true reflection of the state of men's reproductive health.

Understanding the motivations underlying men's fertility preferences can help to inform programmatic approaches that address unwanted fertility. It is likely that much of the research among women about the negative consequences of unwanted fertility or of not being able to plan the timing and spacing of births may also be relevant for men. For women, unwanted fertility among men is associated with

higher levels of depression and lower levels of happiness (Barber et al 1999) while a large body of literature documents the economic consequences unwanted childbearing can have, particularly lower incomes and increased dependency (Trussell 1976). Using data that is accurate and reflective of men's attitudes and behaviors to understand the consequences or results of not achieving or exceeding fertility preferences can help inform approaches to improve both the reproductive health and general health of men as well as improve the economic circumstances of men who otherwise would be financially responsible for more children than they can afford to take care of.

Conclusions

Understanding the meaning behind fertility preferences among men allows for a better understanding of inconsistent responses that are prevalent in data aiming to measure fertility preferences. It is important to understand the kinds of inconsistent responses that exist as well as to know the extent or prevalence of those types of mismatch in data being used to inform research and policy. Among men, wanting to stop childbearing before achieving fertility preferences is found more commonly than wanting to continue childbearing despite having already exceeded fertility preferences. At a national level, infant mortality and labor force participation are the two most significant factors related to these types of inconsistent responses while at an individual, among Ghanaian men, wealth expectations, relationship quality, religion, and health status are all important considerations to men. Men have largely been left out of the fertility and fertility preferences literature and the analyses of this thesis aim to close that gap in literature to help researchers better understand how to operationalize and measure fertility preferences among men and to provide some of the needed evidence to support the inclusion of men in reproductive health programs.

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APPENDIX

Data Sources

The analyses in Chapters 2, 3, and 4, draw on and use a number of data sources. These data sources are explained here in fuller detail.

Chapter 2 Data Sources

Data for the meta-analyses in Chapter 4 come from the Demographic and Health Surveys (DHS). Demographic and Health Surveys are administered in over 90 countries, usually every five years, collecting data related to population, health, HIV, reproduction, and nutrition from both women and men of reproductive age. The DHS uses a two-stage cluster sampling procedure to gain a representative sample of the target population. Response rates are generally 95% or higher (ref).

Data come from the most recent Demographic and Healthy Survey among countries that 1) have administered a survey since 2008, 2) administered both a woman's questionnaire and a man's questionnaire during that round and 3) asked all relevant variables of both women and men during that round. Of the 54 countries that have administered a survey since 2008, three countries were excluded because one or more focal variables were not asked during that round, five countries were excluded because the data was not available for public access and eight countries were excluded because the man's questionnaire was not administered during that round. The remaining 38 countries contributed data to the meta-analyses.

Relevant variables

Each DHS questionnaire administered to both women and men contains a "Fertility Preferences" section, with approximately 5-15 questions, depending on the country

and sex of the respondent. To assess the concept of ideal family size, the DHS asks "If you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?" of all women and men that have living children and "If you could choose exactly the number of children to have in your whole life, how many would that be?" of all women and men who have no living children. Desire for a/another child is ascertained by asking "Would you like to have (a/another) child, or would you prefer not to have any (more) children?" of all women and men or if the woman or man's partner is pregnant "After the child you are expecting now, would you like to have another child, or would you prefer not to have any more children?". (See Appendix) Lastly, DHS collects information about the total number of living children the respondent has. For this analysis, total number of living children includes the current pregnancy for all currently pregnant women.

Chapter 3 Data Sources

HIV Prevalence

Estimates of the national HIV prevalence are obtained from the World Health Organization (2009 and 2013) and UNAIDS (2011). The prevalence of HIV refers to the percentage of the population ages 15-49 who are infected with HIV. Each survey year is mapped to the closest HIV prevalence estimate, with preference given to the next closest year, rather than the previous closest year. For example, surveys from 2010 were mapped to the 2011 estimates rather than the 2009 estimates.

Infant Mortality Rate (IMR)

Infant mortality rate estimates come from the World Bank, who releases IMR data every year. The infant mortality rate (IMR) is the number of infants dying before age one per 1000 live births. The data is mapped directly onto each survey year.

Participation in the Labor Force

Estimates of participation in the labor force are obtained from the Human Development Reports, released by the United Nations Development Programme. Participation in the labor force is measured as the employment to population ratio among those 25 years and older. The Human Development Reports are released annually, with the exception of 2012 and so for surveys from that year, data from the 2013 report are used.

Gross Domestic Product/capita (US $)

GDP per capita data are retrieved from the World Bank, who releases data every year for every included survey country. The GDP per capita is defined as the total value of all goods produced and services rendered in a year by population size.

Chapter 4 Data Sources

Qualitative

Focus Group Discussions

Little literature exists exploring men's fertility preferences and thus this gap in the literature lends itself well to qualitative data collection. Focus groups are a qualitative data collection method composed of several focus group members, led by a moderator, that allows for a fairly free interaction between participants (Morgan 1997). This guided but free interaction creates a dynamic and synergistic environment that elicits information about social norms and behaviors rather than individual behaviors and circumstances (Mack et al 2005). Because fertility preferences are thought to be quite reflective of social and familial norms rather than individual behaviors and intentions, the use of focus groups is more appropriate than in-depth

interviews. Further, focus groups work well as an exploratory research method where little research on a topic currently exists (Morgan 1997).

Focus groups should balance both cohesion, for ease and comfort among participants, as well as diversity of ideas. For this Aim, focus groups of married/cohabitating men will be convened and the composition of the focus groups will be stratified by age and type of marriage. Because fertility preferences may not be stable over the life course, it will be important to stratify by age to examine similarities and differences that emerge in the discussions among the various age groups. Fertility preferences may also differ among men that adhere to different religions. This stratification is likely a reflection of societal and cultural norms rather than a reflection of the formation of fertility preferences themselves. Nevertheless, this stratification will help to shed light on the similarities and differences in fertility preferences.

In Ghana, surveys that attempt to measure fertility preferences and intentions often include the response option 'Up to God' acknowledging both the importance of religion in the Ghanaian context as well as the notion that preferences and a fertility mismatch may not always be thought of as quantifiable by the respondent. This points to a large gap in both the literature and the scientific research and that exploration of both of these concepts in this context warrant in-depth qualitative exploration before further quantitative measurement can be undertaken.

Procedures

A field guide was developed and used by the discussion moderator to guide the discussion but was flexible enough to allow for free-flowing thoughts and ideas from

the participants. The field guide presents culturally appropriate scenarios, or vignettes, with several follow-up questions meant to elicit information about societal and cultural norms regarding fertility preferences, the timing of the development of fertility preferences in a man's reproductive life, and the variation of these preferences over the reproductive lifespan. Vignettes, or short stories or scenarios that are read aloud and which participants can then comment on, are a qualitative tool that is used to collect information about social and cultural norms (Kelly & Lesh 2012) and are often used to facilitate discussions about topics that are not often discussed in everyday conversations or when talking about individual experiences would render a participant shy or hesitant and impede the flow of the discussion (Ulin 2004). The field guide was introduced during the local training and was modified to be as culturally relevant as possible. The final field guide incorporated minor changes made during this training session as well as from feedback from the field after the first two focus group discussions.

Nine local research assistants affiliated with the Kwame Nkrumah University School of Science and Technology (KNUST) were recruited to serve various roles during the data collection process. All research assistants were fluent in English as well as the local language, Twi. Four of the research assistants served in an exclusive role as recruiter because of their extensive knowledge of the four study communities as well as their existing relationships with those communities. The five remaining research assistants served in overlapping roles as focus group discussion moderator, note-taker, and translation/transcription. All nine research assistants had prior experience in their assigned roles and attended a three day training workshop. During the training workshop, the purpose of the qualitative collection was described extensively, a

review of ethics standards and the informed consent process was undertaken, a recruitment strategy was developed, the field guide discussion was reviewed as well as translated and back-translated from English-Twi-English, and two mock focus group discussions took place.

Qualitative Sample and Recruitment

The focus group participants were recruited from the same four communities included in the quantitative data source. Using the inclusion criteria that a respondent must be male, between the ages of 18 and 59, and be in a married or cohabitating relationship, the sample was selected purposefully based on characteristics that were important to stratify by. These characteristics were age, stratified into younger and older ages, and religion. Men have long reproductive life spans and it is unclear how men view their fertility preferences over the life course. Further, it is likely that men further into their reproductive life span have more experience with mismatches in preferences and outcomes as well as in thinking about what fertility preferences mean to them. Since, however, limited research around this exists, it will still be important to retain the perspective of both younger and older men for informative and comparative purposes. Additionally, prior studies have found differential fertility behaviors and outcomes based on religion and in Kumasi religious differences may also be indicative of other important differences such as social context and family and community support. A total of eight focus groups were recruited with 6-8 participants were focus group for a total of 54 participants across the eight focus group discussions.

Each of the four recruiters was assigned two focus group discussions to recruit for. Using a list of enumerated households and the occupants in each household in the four

selected communities, eligible men 18-34 and 35-59 were identified and randomly selected. The recruiters were provided with materials that explained the purpose of the study and the expectations of the participant. Each recruiter over-recruited for each focus group discussion to account for no-shows and to ensure that an appropriate number of people were at each discussion to allow for diversity of ideas. The recruiter identified an appropriate location for the focus group discussion and following initial contact with interested participants, scheduled the focus group discussions based on the availability of the participants. Each interested participant received an index card with the date, time, and location of the discussion. Typically, recruitment took 3-5 days per focus group.

On the day of the focus group discussion each participant went through the informed consent process and consented to participating in the discussion as well as to having the discussion audio recorded. They all also consented to the presence of the study lead during the discussion for observational purposes. Background data for each participant was collected and recorded, with no identifying information associated with the collected data. Each participant received an index card with a respondent number to achieve anonymity during the discussion. Once all participants arrived, the moderator again explained the purpose of the discussion as well as outlined guidelines for the discussion. Each discussion lasted, on average, for 45-60 minutes. Following the discussion, each participant received a thank you drink and snack. The moderator, note-taker and study lead all debriefed after each discussion, reflecting on what went well and anything that needed to be improved, particularly after the first two discussions. The study lead also kept a journal of observational notes from each discussion. The entire data collection process occurred over a span of 21 days.

Each translator/transcriber was assigned two focus group discussion audio-recordings. The recordings were translated from Twi to English and transcribed into Microsoft Word and were then uploaded into Atlas.ti for analysis. This translation and transcription process occurred over a period of eight weeks.

The qualitative data collection was approved by the IRBs at both the Johns Hopkins University Bloomberg School of Public Health and the Kwame Nkrumah University of Science and Technology.

Quantitative

Data Source

The Family Health and Wealth Study (FHWS) is a longitudinal, open-cohort study in six countries, Ghana, Malawi, Ethiopia, Uganda, and Nigeria. Using inclusion criteria based on age (15-44 for women and 18-59 for men), relationship status (married or cohabitating), and residency in the study area, FHWS enrolled married or cohabitating couples and administered a survey to both the man and the woman, with the surveys collecting largely identical information about fertility preferences, contraceptive use, health status, and relationship quality. In Ghana, FHWS is implemented by the Kwame Nkrumah University of Science and Technology (KNUST) in collaboration with the Bill & Melinda Gates Institute of Population and Reproductive Health. Participants were recruited from four peri-urban communities near Kumasi, the nation's second largest city, in the Ashanti region of Ghana. Following an enumeration of all households in the selected communities, households were randomly selected the participate and eligible couples enrolled. If a man had more

than one wife, the first wife was invited to participate. If she was unavailable, the second wife was asked to enroll, and so on. Round 1 of data collection occurred in 2010 with 799 married or cohabitating couples enrolling. Respondents were matched with an interviewer of the same sex and the interview was conducted in the local language of Twi. The response rate for Round 1 was 96.7%.

Relevant Variables

To assess family size preference or ideal family size, respondents were asked "People often do not have exactly the number of children they want to have. If you could have exactly the number of children you want, how many children would you want to have?". Respondents provided a numerical answer to this question. Respondents were also asked "Would you like to have (more) children (than you have now)?" and about how many children they have. (See Questionnaire for more details).

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A1. Family Health and Wealth Study: Male Questionnaire

INTERVIEW INFORMATION

DATE OF INTERVIEW |__|__| Day |__|__| Month |__|__||__|__| Year

TIME STARTED |__|__| Hour |__|__| Minutes

TIME ENDED |__|__| Hour |__|__| Minutes

RESULT * |__|

INTERVIEWER NAME
_____

SUPERVISOR
_____

CHECKED BY
_____

ENTERED BY 1)
_____

2)
_____

*RESULT CODES:

1=COMPLETED
2=NOT AVAILABLE
3=POSTPONED
4=REFUSED
5=PARTLY COMPLETED
6=INCAPACITATED
7=OTHER (SPECIFY)
_____

RESPONDENT'S IDENTIFICATION

FIRST NAME
_____

HOUSE ID |__|__||__|__|

FAMILY ID |__|__|

RESPONDENT LINE NUMBER |__|__|

INTERVIEWER: INTRODUCTION AND CONSENT. May I begin the interview now?

NO	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
	SOCIO-DEMOGRAPHIC CHARACTERISTICS I would like to start by asking you a few questions about yourself.		
Q1	Please tell me your date of birth or your age in years.	|__|__| day |__|__| month |__|__||__|__| year |__|__| age (completed years) Don't know 88	
Q2	What is your marital status?	Married (civil, traditional, religious) ..... 1 Living together 2	
Q3	How long have you been married/living together?	|__|__| years Don't know 88	→ **Q5**
Q4	How many times have you been married before?	|__|__| times Respondent doesn't answer 99	
Q5	Do you have more than one wife?	Yes ..... 1 No ..... 2 Respondent doesn't answer 99	→ **Q7** → **Q7**
Q6	If yes to Q5, how many wives do you have?	|__|__| wives Don't know ..... 88 Respondent doesn't answer 99	
Q7	How many children do you have?	|__|__| children Don't know 88	
Q8	How many of your children live with you?	|__|__| children	
Q9	What is your religion?	***ETHIOPIA*** Orthodox ..... 1 Catholic ..... 2 Protestant ..... 3 Muslim ..... 4 Traditional ..... 5 Other ..... 6 _____ ***GHANA*** Catholic ..... 1 Anglican ..... 2 Methodist ..... 3 Presbyterian ..... 4 Other Christian ..... 5 Muslim ..... 6 Traditional/Spiritualist ..... 7 No religion ..... 8 Other ..... 9 _____ ***MALAWI*** Catholic ..... 1 CCAP ..... 2 Anglican ..... 3 Seventh Day Advent./Baptist 4	

		Other Christian ..... 5 Muslim ..... 6 No religion ..... 7 Other ..... 8 _____ ***NIGERIA*** Catholic..... 1 Protestant ..... 2 Pentecostal..... 3 Other Christian ..... 4 Islam..... 5 Traditionalist ..... 6 Other..... 7 _____ ***UGANDA*** Catholic..... 1 Protestant ..... 2 Muslim ..... 3 Pentecostal..... 4 Seventh Day Adventist ..... 5 Other..... 6 _____	
Q10	To what ethnic group do you belong?	***ETHIOPIA*** Affar ..... 1 Amhara..... 2 Guragie ..... 3 Oromo..... 4 Sidamo ..... 5 Somali ..... 6 Tigraway ..... 7 Welaita ..... 8 Other..... 9 _____ ***GHANA*** Akan ..... 1 Ga/Dangme ..... 2 Ewe..... 3 Guan..... 4 Mole-Dagbani ..... 5 Grussi ..... 6 Gruma..... 7 Hausa ..... 8 Other..... 9 _____ ***MALAWI*** Chewa ..... 1 Tumbuka..... 2 Lomwe..... 3 Tonga ..... 4 Yao ..... 5 Sena ..... 6 Nikonde ..... 7 Ngoni ..... 8 Other..... 9 _____ ***NIGERIA*** Yoruba……1 Igbo……2 Hausa/Fulani……..3 Other……4	

		UGANDA Specify _____	
MIGRATION			
Q11	Tell me, please, have you always lived in the community where you now live?	Yes ..... 1 No ..... 2 Don't know 88	
Q12	How long have you lived in this community?	|__|__| years Don't know 88	
Q13	Tell me, please, where were you born?	Country _____ Region _____ State/district _____ Location (Village/town/city name) _____ Don't know 88	→ **Q15**
Q14	Was the place where you were born:	The capital city ..... 1 Another city ..... 2 A town ..... 3 A peri-urban settlement ..... 3 A village ..... 4 Don't know 88	
Q15	Have you ever lived anywhere else, apart from the place where you were born and where you live now?	Yes ..... 1 No ..... 2 Don't know ..... 88 Respondent doesn't answer 99	→**Q18** →**Q18** →**Q18**
Q16	Was it a city, urban-type settlement, or village? [INTERVIEWER: If more than one place, record the most recent]	Town ..... 1 City ..... 2 Peri-urban ..... 3 Village ..... 4 Don't know 88	
Q17	How old were you when you moved from the place where you were born?	|__|__| years Don't know 88	

FERTILITY PREFERENCES/FAMILY EXPECTATIONS Now I would like to ask you questions about your family size and expectations.			
Q18	Would you like to have (more) children (than you have now)?	Yes ..... 1 No ..... 2 Don't know 8 8	→ **Q20** → **Q20**
Q19	How many (more) children would you like to have?	|__|__| number Don't know 8 8	→ **Q21** → **Q21**
Q20	Why not more?	Economic reasons ..... 1 To give children better living conditions ..... 2 Health concerns ..... 3 To avoid troubles and worry ..... 4 Other ..... 5 _____ Don't know	

		..... 8 8	
Q21	People often do not have exactly the number of children they want to have. If you could have exactly the number of children you want, how many children would you want to have?	|__|__| number Don't know 8 8	
Q22	How many of these children would you like to be boys, how many would you like to be girls and for how many would the sex not matter?	|__|__| boys |__|__| girls |__|__| either Don't know 8 8	
Q23	How many children do you think a family should have?	|__|__| number As many as God wants ..... 0 0 Don't know 8 8	
Q24	Why not more?	Economic reasons ..... 1 To give children better living conditions ..... 2 Health concerns..... 3 To avoid troubles and worry ..... 4 Other ..... 5 _____ Don't know 8 8	
Q25	Why not less?	Religious and moral reasons ..... 1 Because some children die ..... 2 Because I like children..... 3 Because my wife wants a large family..... 4 Other ..... 5 _____ Don't know 8 8	
Q26	In your opinion, what is the ideal age for a woman to get married?	|__|__| years Don't know 8 8	
Q27	How much time should there be between marriage and the birth of the first child?	Less than 1 year..... 1 From 1 to 2 years ..... 2 From 2 to 3 years ..... 3 From 3 to 4 years ..... 4 From 4 to 5 years ..... 5 More than 5 years..... 6 Don't know 8 8	
Q28	Do you think it is advisable to let some time pass between consecutive births?	Yes ..... 1 No..... 2 Don't know 8 8	→ **Q30** → **Q30**
Q29	How long?	|__|__| years |__|__| months Don't know 8 8	
Q30	How old should a woman be at her last child bearing?	|__|__| years	

		Don't know 8 8	
Q31	Have you and your wife(ves) ever discussed the number of children you would like to have?	Yes ..... 1 No ..... 2 Don't remember 8 8	
Q32	Does your wife/do your wives (together) want the same number of children that you want, or does she/do they want more or fewer than you want?	Same number ..... 1 More children ..... 2 Fewer children ..... 3 Don't know 8 8	→ **Q34** → **Q34**
Q33	How many (more/less)?	|__|__| number As many as God wants ..... 0 0 Don't know 8 8	
Q34	Would it be inconvenient for you to have a(nother) child at this time?	Yes ..... 1 No ..... 2 Not sure 8 8	→ **Q36** → **Q36**
Q35	Why?	Lack of money ..... 1 Health concerns ..... 2 Too much extra work ..... 3 Fear of pregnancy or delivery ..... 4 Have enough children ..... 5 Other ..... 6 _____ Not applicable (infecund) ..... 0 0 Don't know ..... 8 8 Respondent doesn't answer 9 9	
Q36	When would you like to have a(nother) child in case you were to have one?	Right away ..... 1 00 |__|__| years |__|__| months from now When God wants 00 Don't know 8 8	
Q37	Some people think that having many children will help parents with financial security. Do you strongly agree, somewhat agree, somewhat disagree, strongly disagree?	Strongly agree ..... 1 Somewhat agree ..... 2 Somewhat disagree ..... 3 Strongly disagree 4	
Q38	How much education (schooling) would you like (have liked) for your sons (if you have/had one)?	Some primary school ..... 1 Completed primary school ..... 2 Some high school ..... 3 Completed high school ..... 4 Some college/university ..... 5 Completed college/university ..... 6 No particular level desired ..... 7 Don't know	

		..... 8 8	
Q39	How much education (schooling) would you like (have liked) for your daughters (if you have/had one)?	Some primary school ..... 1 Completed primary school ..... 2 Some high school ..... 3 Completed high school ..... 4 Some college/university ..... 5 Completed college/university ..... 6 No particular level desired ..... 7 Don't know 8 8	
Q40	Can you afford for all your children to go to school and study as much as they want?	Yes ..... 1 No ..... 2 Other ..... 3 _____ Don't know 8 8	**→Q42**
Q41	If you are not able to afford schooling for all your children, what do you plan to do?	I will send only a few of my children to school, boys or girls ..... 1 I will send only my boys to school ..... 2 I will send only my daughters to school ..... 3 I will not send any of my children to school. 4 Other ..... 5 _____ Don't know 8 8	
Q42	Who usually makes major decisions concerning your children's education?	Me ..... 1 My spouse(s) ..... 2 Both of us ..... 3 Other ..... 4 _____ Respondent doesn't answer 9 9	
Q43	Who usually makes major decisions concerning your family health care?	Me ..... 1 My spouse(s) ..... 2 Both of us ..... 3 Other ..... 4 _____ Respondent doesn't answer 9 9	
Q44	Who usually makes major decisions at your home, such as buying expensive things or choosing a dwelling?	Me ..... 1 My spouse(s) ..... 2 Both of us ..... 3 Other ..... 4 _____ Respondent doesn't answer 9 9	
Q45	Do you help with the household chores?	Yes ..... 1 No 2	**→ Q47**
Q46	How often?	Frequently ..... 1 Now and then 2	
SEXUAL ACTIVITY/CONTRACEPTION Now I need to ask you some questions about your sexual activity and use of contraception in order to gain a better understanding of some important life issues.			
Q47	How old were you when you had sexual	|__|__| years	

	intercourse for the first time?	Don't remember 8 8	
Q48	When was the last time you had sexual intercourse?	|__|__| days ago |__|__| weeks ago |__|__| months ago |__|__| years ago Don't remember 8 8	
Q49	What was your relationship to this person with whom you had sexual intercourse?	Husband ..... 1 Live-in partner ..... 2 Casual acquaintance ..... 3 Prostitute ..... 4 Other ..... 5 _____ Respondent doesn't answer 9 9	
Q50	For how long have you had (did you have) a sexual relationship with this person? If only had sexual relations with this person once, record "01" days.	|__|__| days ago |__|__| weeks ago |__|__| months ago |__|__| years ago Don't remember 8 8	
Q51	How old is this person? (PLEASE ESTIMATE IF DO NOT KNOW FOR SURE)	|__|__| years Don't know 8 8	
Q52	Apart from this person, have you had sexual intercourse with any other person in the last 12 months?	Yes ..... 1 No ..... 2 Respondent doesn't answer 9 9	
Q53	In total, with how many different people have you had sexual intercourse in the last 12 months?	|__|__| partners Don't know 8 8	
Q54	Please consider the following statement: It is wrong to use contraceptives or other means to avoid or delay pregnancy. Would you say you .....with this statement?	Strongly agree ..... 1 Agree ..... 2 Are neutral ..... 3 Disagree ..... 4 Strongly disagree 5	
Q55	The last time you had sex, have you used a contraceptive method to avoid a pregnancy?	Yes ..... 1 No ..... 2 Don't know ..... 8 8 Respondent doesn't answer 9 9	→ **Q60** → **Q60** → **Q60**
Q56	What contraceptive method did you use?	Pill ..... 1 IUD ..... 2 Condom ..... 3 Spermicides ..... 4 Injectables ..... 5 Implants ..... 6 Diaphragm ..... 7 Periodic abstinence ..... 8 Withdrawal 9	

		Other traditional methods ..... 10 _____ Other method ..... 11 _____ Emergency contraception ..... 12 Male sterilized ..... 13 Female sterilized ..... 14 Don't remember 88	
Q57	Is it easy for you/your partner to get the birth control method you used then?	Yes ..... 1 No ..... 2 Not sure 88	
Q58	From where did you/your partner obtain your method?	_____ Don't remember 88	
Q59	Was the method effective in preventing pregnancy?	Very effective ..... 1 Effective ..... 2 Somewhat effective ..... 3 Not effective at all ..... 4 Respondent doesn't answer 99	
Q60	Would you say that using contraception is mainly your decision, mainly your partner's decision, or did you both decide together?	Mainly respondent ..... 1 Mainly partner ..... 2 Joint decision ..... 3 Other ..... 4 _____ Respondent doesn't answer 99	
Q61	How often do you discuss using contraceptive methods with your wife(ves)/partner(s)?	Often ..... 1 Sometimes ..... 2 Never ..... 3 Don't know ..... 88 Respondent doesn't answer 99	
Q62	Do you think you will rely on a contraceptive method to delay or avoid pregnancy at any time in the future?	Yes ..... 1 No ..... 2 Don't know 88	→ **Q64** → **Q64**
Q63	Which contraceptive method would you prefer to rely on?	Pill ..... 1 IUD ..... 2 Condom ..... 3 Spermicides ..... 4 Injectables ..... 5 Implants ..... 6 Diaphragm 7	**SKIP**

		Periodic abstinence ..... 8 Withdrawal..... 9 Other traditional methods ..... 10 Female sterilization ..... 11 Male sterilization ..... 12 Other method ..... 13 _____ Unsure 88	**TO Q65**
Q64	What is the main reason that you think you do not (will not) rely on a contraceptive method at any time in the future?	Infrequent sex/no sex ..... 1 Wife at menopause/had hysterectomy ..... 2 Subfecund/infecund..... 3 Wants as many children as possible ..... 4 Respondent opposed ..... 5 Wife/partner opposed ..... 6 Other opposed..... 7 Religious prohibition ..... 8 Knows no method..... 9 Knows no source to get the method ..... 10 Health concerns ..... 11 Fear of side-effects ..... 12 Lack of access/too far ..... 13 Costs too much ..... 14 Inconvenient to use ..... 15 Interferes with body's normal processes ..... 16 Other ..... 17 _____ Respondent doesn't answer 99	

RELATIONSHIP QUALITY

I would now like to ask you some questions related to your relationship with your interviewed/to be interviewed wife/partner. On a scale from 1 to 9 where 1 is "not at all" and 9 is "extremely" please tell me how true the following statements are to you:

Q65	I expect my love for this partner to last for the rest of my life	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely

Q66	I can't imagine ending my relationship with this partner	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
Q67	I view my relationship with this partner as permanent	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
Q68	I am committed to maintaining my relationship with this partner	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
Q69	I have confidence in the stability of my relationship with this partner	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
On a scale from 1 to 7 where 1 is “never” and 7 is “all the time” please tell me how much you agree with the following statements:		
Q70	My partner is primarily interested in her own welfare	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree nor disagree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q71	There are times when my partner cannot be trusted	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree nor disagree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q72	My partner is perfectly honest and truthful with me	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree nor disagree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q73	I feel I can trust my partner completely	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree nor disagree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q74	My partner is truly sincere in her promises	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree nor disagree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q75	I feel that my partner does not show me enough consideration	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree nor disagree Neither agree nor disagree Mildly disagree Disagree Strongly disagree

Q76	My partner treats me fairly and justly	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree nor disagree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q77	I feel that my partner can be counted on to help me	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree nor disagree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
On a scale from 1 to 6 where 1 is “never” and 6 s “all the time” please tell me how often ……		
Q78	How often do you discuss or have you considered divorce, separation or terminating your relationship?	1 2 3 4 5 6 Never Rarely Occasionally More often than not Most of the time All of the time
Q79	How often do you or your partner leave the house after a fight?	1 2 3 4 5 6 Never Rarely Occasionally More often than not Most of the time All of the time
Q80	In general, how often do you think that things between you and your partner are going well?	1 2 3 4 5 6 Never Rarely Occasionally More often than not Most of the time All of the time
Q81	Do you confide in your partner?	1 2 3 4 5 6 Never Rarely Occasionally More often than not Most of the time All of the time
Q82	Do you ever regret that you married?	1 2 3 4 5 6 Never Rarely Occasionally More often than not Most of the time All of the time
Q83	How often do you and your partner quarrel?	1 2 3 4 5 6 Never Rarely Occasionally More often than not Most of the time All of the time
Q84	How often do you and your partner “get on each other’s nerves?”	1 2 3 4 5 6 Never Rarely Occasionally More often than not Most of the time All of the time
Last, on a scale from 1 to 10 where 1 is “very unlikely” and 10 is “very likely” please tell me what do you do when a problem arises in your relationship.		
Q85	We try to discuss the problem	1 2 3 4 5 6 7 8

		9 10 Very unlikely Very likely
Q86	We express their feelings to each other	1 2 3 4 5 6 7 8 9 10 Very unlikely Very likely
Q87	We suggest possible solutions and compromises	1 2 3 4 5 6 7 8 9 10 Very unlikely Very likely
Q88	We blame, accuse and criticize each other	1 2 3 4 5 6 7 8 9 10 Very unlikely Very likely
Q89	We threaten each other with negative consequences	1 2 3 4 5 6 7 8 9 10 Very unlikely Very likely
Q90	I call my partner names, swear at him/her, or attack his/her character	1 2 3 4 5 6 7 8 9 10 Very unlikely Very likely
Q91	My partner calls me names, swears at me, or attacks my character	1 2 3 4 5 6 7 8 9 10 Very unlikely Very likely
To sum up, please tell me:		
Q92	How often do you kiss/hug/embrace your partner?	1 2 3 4 5 Every day Almost every day Occasionally Rarely Never
Q93	Please rate how happy you are in your relationship	1 2 3 4 5 6 Unhappy Happy Perfectly happy
Q94	Please rate your feelings about the future of the relationship	1 2 3 4 5 6 Never succeed Will succeed at any cost

HEALTH STATUS

Now let's talk about your health.

Q95	Tell me, please, how would you evaluate your health? Is it:	Very good.....1 Good .....2 Average (not good, but not bad).....3 Bad.....4 Very bad.....5
Q96	In general, how do you think your physical health affects your daily activities?	Everything is normal.....1 It sometimes affects my ability to work/carry out everyday activities.2 It often affects my ability to work/carry out everyday activities.....3 Not able to work/carry out everyday

		activities.....4

Health problems	Q97. Do you have of the following health problems?	Q98. For how long have you had ……?	Q99. Do you currently take any medicine for …..?	Q100. How does this health problem affect your work/other daily activities?
a) Pain or other unpleasant feeling in the chest area	Yes .....1 No.....2→**Q97b**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
b) Difficulty in breathing	Yes .....1 No.....2→**Q97c**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
c) Abdominal pain	Yes .....1 No.....2→**Q97d**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
d) Back pain	Yes .....1 No.....2→**Q97e**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
e) Restrictions in using your arms	Yes .....1 No.....2→**Q97f**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
f) Restrictions in walking	Yes .....1 No.....2→**Q97g**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
g) Problems with vision	Yes .....1 No.....2→**Q97h**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
h) Problems with hearing	Yes .....1 No.....2→**Q97i**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
i) Problems speaking	Yes .....1 No.....2→**Q97j**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
j) Psychological problems	Yes .....1 No.....2→**Q97k**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
k) Headache or migraine	Yes .....1 No.....2→**Q97l**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
l) Toothache	Yes .....1 No.....2→**Q97m**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
m) Sexual dysfunction	Yes .....1 No.....2→**Q97n**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
n) Any urethral discharge	Yes .....1 No.....2→**Q97o**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|
o) Skin problems	Yes .....1 No.....2→**Q101**	|__|__| days |__|__| months |__|__| years	Yes .....1 No.....2	|__|__|

CODES FOR Q100:
1=Everything is normal; 2=It sometimes affects my ability to work/carry out everyday activities; 3=It often affects my ability to work/carry out everyday activities; 4=Not able to work/carry out everyday activities.

Q101 Did you see a health provider about any of these problems?
Yes 1
No 2
Don't remember 88

Diseases	Q102. Have you ever been told by a doctor that you have ……	Q103. How long ago did you develop the first disease symptoms?	Q104. Do you currently suffer from .....?	Q105. Do you currently take any medicine for …..?	Q106. How does this health problem affect your work and

		RECORD "00" IF NO SYMPTOMS			other daily activities?
a) Hypertension (high blood pressure)	Yes ..... 1 No ..... 2→**Q102b**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104b**	Yes ..... 1 No 2	|__|__|
b) Heart disease	Yes ..... 1 No ..... 2→**Q102c**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104c**	Yes ..... 1 No 2	|__|__|
c) Stroke	Yes ..... 1 No ..... 2→**Q102d**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104d**	Yes ..... 1 No 2	|__|__|
d) Chronic pulmonary disease	Yes ..... 1 No ..... 2→**Q102e**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104e**	Yes ..... 1 No 2	|__|__|
e) Ulcer disease	Yes ..... 1 No ..... 2→**Q102f**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104f**	Yes ..... 1 No 2	|__|__|
f) Liver disease	Yes ..... 1 No ..... 2→**Q102g**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104g**	Yes ..... 1 No 2	|__|__|
g) Kidney/urinary disease	Yes ..... 1 No ..... 2→**Q102h**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104h**	Yes ..... 1 No 2	|__|__|
h) Diabetes	Yes ..... 1 No ..... 2→**Q102i**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104i**	Yes ..... 1 No 2	|__|__|
i) Arthritis	Yes ..... 1 No ..... 2→**Q102j**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104j**	Yes ..... 1 No 2	|__|__|
j) Malaria	Yes ..... 1 No ..... 2→**Q102k**	|__|__| days |__|__| months	Yes..... 1 No ..... 2→**Q104k**	Yes	|__|__|

		|__|__| years		1 No 2	
k) Tuberculosis	Yes ..... 1 No ..... 2→**Q102l**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104l**	Yes ..... 1 No 2	|__|__|
l) HIV/AIDS	Yes ..... 1 No.....2→**Q102m**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No.....2→**Q104m**	Yes ..... 1 No 2	|__|__|
m) STIs	Yes ..... 1 No ..... 2→**Q102n**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q104n**	Yes ..... 1 No 2	|__|__|
n) Cancer Record type(s) |__|__| |__|__| |__|__|	Yes ..... 1 No ..... 2→**Q107**	|__|__| days |__|__| months |__|__| years	Yes..... 1 No ..... 2→**Q107**	Yes ..... 1 No 2	|__|__|

CODES FOR Q175:
1=Everything is normal; 2=It sometimes affects my ability to work/carry out everyday activities; 3=It often affects my ability to work/carry out everyday activities; 4=Not able to work/carry out everyday activities; 88=Don't know.

CODES FOR TYPE(S) OF CANCER (n):
01=Bladder; 02=Blood; 03 Bone; 04=Brain; 05=Breast; 06=Cervix; 07=Colon; 08=Esophagus; 09=Gallbladder; 10=Kidney; 11=Larynx-windpipe; 12=Leukemia; 13=Liver; 14=Lung; 15=Lymphoma; 16=Melanoma; 17=Mouth/tongue/lip; 18=Ovary; 19=Pancreas; 20=Prostate; 21=Rectum; 22=Skin (non-melanoma); 23=Skin (DK what kind); 24=Soft tissue (muscle or fat); 25=Stomach; 26=Testis; 27=Throat–pharynx; 28=Thyroid; 29=Uterus; 30=Other; 88=Don't know; 99=Respondent doesn't answer.

Q107 Have you had any major surgery? If so, what type of surgery was it?

a _____

b _____

c _____

No surgery 00
Don't remember 88

INTERVIEWER: IF THE RESPONDENT DID NOT IDENTIFY ANY HEALTH PROBLEMS SKIP TO Q112.

Q108 In the next 6 months, are you going to seek medical care for any of the health conditions or diseases you currently have? If yes, for which health condition or disease?

CIRCLE ALL THAT APPLY

No 00

Health problems.....1
a b c d e f g h i j k l m n o

Diseases 2
a b c d e f g h i j k l m n

Respondent doesn't answer.....99

Q109 Which of the health conditions, diseases and surgeries you suffered from have affected

None .....00 **→Q112**

Health problems.....1

	your sexual activity or reproductive health?	**a b c d e f g h i j k l m n o** Diseases .....2 **a b c d e f g h i j k l m n** Surgeries.....4 **a b c**	
	INTERVIEWER: READ ALL HEALTH CONDITIONS, DISEASES AND SURGERIES IDENTIFIED BY THE RESPONDENT IN Q166, Q171 AND Q176; CIRCLE ALL THAT APPLY	Respondent doesn't answer.....99	**→Q112**
Q110	How often do these health problems affect your sexual activity or reproductive health?	Sometimes .....1 Often times.....2 Most of the time.....3 Always.....4	
Q111	How much do these health problems affect your sexual activity or reproductive health? CIRCLE ALL THAT APPLY	They prevent me from having sexual intercourse.....1 They make sexual intercourse painful.....2 They make sexual intercourse difficult .....3 They make sexual intercourse uncomfortable.....4 They make sexual intercourse dangerous for me .....5 I cannot use certain contraceptive methods .....6 I cannot have (more) children .....7 They caused infertility problems.....8	
Q112	Have you ever smoked?	Yes.....1 No .....2 Respondent doesn't answer.....99	**→Q116** **→Q116**
Q113	How old were you when you started to smoke?	|__|__| years Don't remember 88	
Q114	Do you smoke at the present time?	Yes.....1 No .....2 Respondent doesn't answer.....99	
Q115	When was the last time you smoked?	|__|__| hours |__|__| days |__|__| years Respondent doesn't answer.....99	
Q116	Have you consumed any alcoholic beverages in the last 12 months?	Yes.....1 No .....2 Respondent doesn't answer.....99	**→END** **→END**
Q117	How often do you (he/she) use alcoholic beverages?	Practically every day .....1 3-4 times a week.....2 1-2 times a week.....3 1-2 times a month .....4 Less than once a month.....5 Don't remember .....88 Respondent doesn't answer.....99	

INTERVIEWER: THANK THE RESPONDENT FOR COMPLETING THIS FIRST PART OF THE INTERVIEW. TELL RESPONDENT THAT YOU WILL VISIT HIM AGAIN IN 6 MOTNHS AND SCHEDULE YOUR VISIT.

INTERVIEWER'S REMARKS

I1.Was any one else present during the interview?	**I2.In general, what was the respondent's attitude during the interview?**	**I3.Did the respondent understand the questions?**
No one else was present ..... 1 Respondent's wife(s) ..... 2 Respondent's children ..... 3 Respondent's parents..... 4 Other adults..... 5	Friendly, interested ..... 1 Was cooperative, but not particularly interested..... 2 Impatient, worried ..... 3 Hostile 4	Understood well .....1 Did not understand very well .....2 Understood poorly.....3

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EDUCATION

Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD
Ph.D. Population, Family, and Reproductive Health
Anticipated Completion: October 2015
Concentrations in Demographic Methods, Population and Health
Dissertation: Measuring the Complexity of Men's Fertility Preferences

Pennsylvania State University, University Park, PA
B.A. in Economics with Honors in Economics, 2008
B.A. in International Politics with Honors in Economics, 2008
Schreyer Honors Scholar
Honors Thesis: The Determinants of Education in Sub-Saharan Africa: Kenya and Cameroon

RESEARCH EXPERIENCE

CONSULTANT, World Health Organization, Geneva, Switzerland, September 2015 – Current

- Toolkit for post-hoc evaluations of adolescent sexual and reproductive health programs, in conjunction with the MacArthur Foundation
- Interventions designed to prevent repeat pregnancy and abortion in Ghana and Malawi
- Outcome evaluation of Ecole d'Marie (School for Husbands) program in Benin

RESEARCH ASSISTANT, Johns Hopkins University, Baltimore, MD, January 2013 – Current

- In conjunction with the MacArthur Foundation, four systematic reviews exploring high quality interventions and evaluations of early marriage, early pregnancy, repeat pregnancy, and sexually transmitted infections among adolescents in low- and middle-income countries

RESEARCH ASSISTANT, Johns Hopkins University, Baltimore, MD, January 2013 – Current

- Construction and evaluation of the performance of a couple weight, to be used in Demographic and Health Surveys and other surveys more broadly collecting couples data

RESEARCH ASSISTANT AND DATA MANAGER, Bill & Melina Gates Institute for Population and Reproductive Health, Baltimore, MD, May 2013 – August 2015

- Performance, Monitoring, and Accountability 2020, a multi-country study collecting sexual and reproductive health information from women using mobile phone technology
- Assisted with design of Service Delivery Point survey tool and survey manual; conducted implementation training and re-training in Ghana and Ethiopia; lead on data cleaning, processing, and evaluation of SDP data

RESEARCH ASSISTANT, Johns Hopkins University, Baltimore, MD, January 2012 – January 2015

- Well-Being of Adolescents in Vulnerable Environments, a multi-country qualitative and qualitative study of adolescents focusing on sexual and reproductive health, mental health, and violence
- Assisted with the design of the quantitative survey tool used in five sites; piloted the tool in the Baltimore site; part of the data collection team for the Baltimore site; assisted with

data cleaning and processing; jointly worked on manuscript writing focusing on both mental health and survey methods

RESEARCH ASSISTANT, Johns Hopkins University, Baltimore, MD, October 2012 – May 2013

- In conjunction with the World Health Organization, systematic review of interventions targeting outcomes among adolescents and their potential integration with the dissemination of the HPV vaccine in low- and middle-income countries

ECONOMIC RESEARCH ANALYST, Federal Trade Commission, Washington, DC, July 2008 – August 2011

- Analyst in the Antitrust Division; provided analytical and research support for litigation and research; responsibilities include statistical data analysis including programming, and writing and presenting clear, logical and concise summaries of data results

INTERN, Population Council, New York, NY, June 2007 – August 2007

- Microbicide development efforts; dissemination of timely information to promote awareness of the project to domestic and international research and media outlets

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PUBLICATIONS

Decker, M., **Kalamar, A.**, Tunçalp, Ö., Hindin, M. "Early Adolescent Childbearing in Low- and Middle-Income Countries: Associations with Income Inequity, Human Development, & Fender Equality." Under review at Health Policy and Planning.

Decker, M., Marshall, B., Emerson, M., **Kalamar, A.**, Covarrubius, L., Astone, N., Wang, Z., Gao, E., Mashimbye, L., Delany-Moretlwe, S., Acharaya, R., Jejeebhoy, A., Olumide, A., Ojengbede, O., Sonenstein, F., Blum, R. "Respondent-driven Sampling for an Adolescent Health Study in Vulnerable Urban Settings: A Multi-Country Study." *Journal of Adolescent Health,* 55, (2014), S6-S12.

Cheng, Y., Li, X., Chaohua, L., Sonenstein, F., **Kalamar, A.**, JeJeebhoy, A., Delany-Moretlwe, S., Brahmbatt, H., Olumide, A.O., Ojengbede, O. "The Association Between Social Support and Mental Health Among Vulnerable Adolescents in Five Cities: Findings from the Study of the Well-Being of Adolescents in Vulnerable Environments." *Journal of Adolescent Health,* 55, (2014), S31-S38.

CONFERENCE PRESENTATIONS

Kalamar, A., Hindin, M. "The Complexity of Measuring Fertility Preferences: Evidence from DHS Data in 38 Countries." To be presented at the International Family Planning Conference, Nusa-Dua, Indonesia, November 2015.

Becker, S., **Kalamar, A.** "Sampling Weights for Analyses of Couple Data in Demographic and Health Surveys." Accepted to the 7th African Population Conference, Johannesburg, South Africa, December 2015.

Kalamar, A., Hindin, M. "The Complexity of Measuring Fertility Preferences: Evidence from DHS Data." Population Association of America 2015 Annual Meeting, San Diego, CA, April 2015.

Kalamar, A., Decker, M., Marshall, B. Blum, RW., Sonenstein, F., Mmari, K."Extreme Warfare in Baltimore: Adolescents in Vulnerable Communities, Violence, and Mental Health" Population Association of America 2014 Annual Meeting, Boston, MA, May 2014.

INVITED PRESENTATIONS

Kalamar, A. "Fertility Preferences Among Men in Kumasi, Ghana", Kwame Nkrumah University of Science and Technology, School of Medical Science, Kumasi, Ghana, 9 February 2015.

TEACHING EXPERIENCE
Teaching Assistant: Population Dynamics and Public Health, Summer 2012
Teaching Assistant: Life Course Perspectives on Health, Fall 2012
Teaching Assistant: Principles of Population Change, Fall 2012

SERVICE TO THE UNIVERSITY
Student Representative, Doctoral Committee, PFRH, Johns Hopkins University, 2014
Student Representative, Admissions Committee, PFRH, Johns Hopkins University, 2014
President, PFRH Departmental Student Alliance, Johns Hopkins University, 2012-2013

PROFESSIONAL MEMBERSHIP
The Population Association of America

SKILLS
STATA, ArcGIS, Excel, Open Data Kit; Beginner knowledge of R, VBA, SQL

ACADEMIC HONORS AND AWARDS
Gates Institute Dissertation Research Grant
Johns Hopkins University, Family Planning Fellowship
Johns Hopkins University, Dr. Michael Koening Memorial Fund
Johns Hopkins University, Caroline Cochran Scholarship Fund
Johns Hopkins University, Robertson Award
Penn State Department of Economics Honors Program Scholar
Penn State Schreyer Honors College Scholar
Phi Beta Kappa